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# Aarushi talwar case study pdf free pdf file

Machine Learning Approaches to Real Estate Market Prediction Problem: A Case Study

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## Abstract

Home sale prices are formed given the transaction actors economic interests, which include government, real estate dealers, and the general public who buy or sell properties. Generating an accurate property price prediction model is a major challenge for the real estate market. This work develops a property price classification model using a ten-year actual dataset, from January 2010 to November 2019. The real estate dataset is publicly available and was retrieved from Florida's Volusia County Property Appraiser website. In addition, socio-economic factors such as Gross Domestic Product, Consumer Price Index, Producer Price Index, House Price Index, and Effective Federal Funds Rate are collected and used in the prediction model. To solve this case study problem, several powerful machine learning algorithms, namely, Logistic Regression, Random Forest, Voting Classifier, and XGBoost, are employed. They are integrated with target encoding to develop an accurate property sale price prediction model with the aim to predict whether the closing sale price is greater than or less than the listing sale price. To assess the performance of the models, the accuracy, precision, recall, classification F1 score, and error rate of the models are determined. Among the four studied machine learning algorithms, XGBoost delivers superior results and robustness of the model compared to other models. The developed model can facilitate real estate investors, mortgage lenders and financial institutions to make better informed decisions.

#### 1. Introduction

Accurate home sale price prediction problem is essential for the real estate market. Besides buyers and sellers, the housing market includes several other stakeholders, local and state government, real estate dealers, financial institutions, and market predictors. Real estate domain is also an important part of the economy that can drive up and down the stock exchange market and even generate disruptive economic events. This was experienced not long ago, when the subprime mortgage crisis ultimately led to the depreciation of the real estate market and caused a worldwide recession [1]. The recession emphasized the need for better market prediction, particularly in the real estate domain. In periods of economic expansion, construction and employment in the real estate sector grow significantly and result in higher property prices [2]. The trend reverses in the periods of economic contraction. Nevertheless,

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# Requirements of API Documentation: A Case Study into Computer Vision Services

Alex Cummaudo, Rajesh Vasa, John Grundy, and Mohamed Abdelrazek

Abstract—Using cloud-based computer vision services is gaining traction, where developers access Al-powered components through familiar RESTM APIs, not needing to orchestrate large training and inference infrastructures or curatefabel training datasets. However, while these APIs seem familiar to use, their non-deterministic run-time behaviour and evolution is not adequately communicated to developers. Therefore, improving these services' API documentation is paramount—more extensive documentation facilitates the development process of intelligent software. In a prior study, we extracted 34 API documentation artefacts from 21 seminal works. devising a taxonomy of five key requirements to produce quality API documentation. We extend this study in two ways. Firstly, by surveying 104 developers of varying experience to understand what API documentation artefacts are of most value to practitioners. Secondly, identifying which of these highly-valued artefacts are or are not well-documented through a case study in the emerging computer vision service domain. We identify: (i) several gaps in the software engineering literature, where aspects of API documentation understanding is is not extensively investigated; and (ii) where industry vendors (in contrast) document artefacts to better serve their end-developers. We provide a set of recommendations to enhance intelligent software documentation for both vendors and the wider research community.

Index Terms-Intelligent Web Services and Semantic Web, Code Documentation, Computer Vision

### INTRODUCTION

MPROVING API documentation quality is a valuable task for any API. Succinct API documentation of good quality facilitates productivity [32, 38, 37], and therefore improved quality is better engineered into a system [35]. Where application developers integrate new services into their systems via APIs, their productivity is affected either by inadequate skills ("Tre never used an API like this, so must learn from scratch") or, where their skills are adequate, an imbalanced cognitive load that causes excessive context switching ("I have the skills for this, but am confused or misunderstand"). As a real-world use case, consider intelligent computer vision services, in which an Al-based component produces a nondeterministic result based on a machine-learnt data-driven algorithm, rather than a predictable, rule-driven one [10]. These services use machine intelligence to make predictions on images such as object labelling or facial recognition can construct systems better with improved documentation. [W1-15]. The impacts of poor and incomplete documentation results in developer complaints on online discussion forums such as Stack Overflow [11]. Many comments show that developers do not think in the non-deterministic mental model of the designers who created the computer vision services. They ask many varied questions from their peers to try and clarify their understanding.

It is therefore important to ensure developers have access to high-quality API documentation artefacts when consum-

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ing these services. Vendors should cover all documentation artefacts that the wider developer community find valuable, and the research community should aide in this process by investigating with types of information that comprise these artefacts, or the aspects of information design to best present this information. What causes a developer to be confused when using an API, and how to mitigate it via improved. documentation, has been largely explored by researchers for conventional APIs (an overview is provided in section 2). Various studies provide a myriad of recommendations into the value of API documentation artefacts based on both qualitative and quantitative analyses, involving developer opinions (from surveys), observation of developers, event logging or content analysis (see fig. 3). Such guidelines propose ways for developers, managers, and solution architects

However, there does not yet exist a consolidated systenutic review of this literature. Further, few studies offer a taxonomy to consolidate these guidelines together, and there still lacks a consolidated effort to capture guidelines on the requirements of good quality API documentation. Studies that produce these guidelines from literature are largely scattered across multiple sources. Investigating the ways by which these guidelines are produced can provide software engineering researchers with better insight into the research methods and data collection techniques used to produce these guidelines. Some studies, for example, use case studies, others use focus groups and brainstorming, or interviews and surveys. The extent to which researchers rely on developer opinion for API documentation guidelines is evident, and gaps in the methodological approaches that researchers use should be emphasised to shine light into new ways of conducting research in this important area. Furthermore, systematically capturing the information distilled



string of questions which arise out of SPR Prasad's submission is that who tampered with the evidence? The negligence on the part of Noida Police was reported in The Hindu as well where it is said that 90 percent of the evidence was lost due to the negligence of the Noida Police. The Noida Police did not cordon off the crime scene and allowed wiping of possible crucial evidence, whereas, negligence on the part of the CBI allowed misplacing of the vaginal swab of the deceased Aarushi and a mismatch of information about pillowcases that had stains of Hemraj's blood. A PIL was filed in the Supreme Court that challenged the narco-analysis tests conducted on Rajesh Talwar. Rajesh Talwar along with the other domestic help, Krishna were arrested by the CBI. The CBI is also accused of tampering with vital evidence by none other than the Allahabad High Court itself. The couple then approached the apex court to get the trial against them stayed. The vaginal swab of the deceased teenager was sent to Central Forensic Science Laboratory (CFSL). On account of which possible vital information was lost. The High Court alleged that the premier investigating agency connived with Centre for DNA Fingerprinting and Diagnostics (CDFD) to remove a key evidence — a blood-stained pillowcase — seized from Krishna's home, a servant of the Talwars. The police also allowed cleaning and white-washing of the room where Aarushi was killed, thus allowing crucial evidence to be wiped off forever. Nupur and Rajesh Talwar were sentenced to life imprisonment in 2013 for the double murder, against which the couple filed an appeal in the High Court the same year. Here's the entire timeline of the murder case that had kept the entire country waiting for the court's decision: On May 16, 2008, 14 years old Aarushi Talwar was found dead in her bedroom with her throat slit and head bludgeoned. Now the question arises which one of the CDFD's versions about the pillowcases were correct? In February 2011, the couple filed a petition in the Allahabad High Court to get the trial court's summons against them quashed, which was dismissed by the court which ordered to start criminal proceedings against them. If, yes under whose influence did this happen? "He categorically deposed before the trial court that all his seals have been broken, all his envelopes have been torn open and he cannot say who broke these seals, who tore open the envelopes, when this was done," the high court said. And for whom? The police did not even care to search Talwar's house after Aarushi's death. Whether it was the initial one which submitted that the pillow cover which was recovered from Krishna's room had blood stains of Hemraj was correct? The CBI ultimately declared the case 'inconclusive'. Special Judge S. Lal sentenced the couple to life imprisonment on November 26, 2013. Or whether it was later one which said that only the pillowcase which meed to be answered without which any the pillowcase which was recovered from Hemraj's room had his blood stain? Was it intentional? These are crucial questions which need to be answered without which any the pillowcase which was recovered from Hemraj's room had his blood stain? Was it intentional? These are crucial questions which need to be answered without which any the pillowcase which was recovered from Hemraj's room had his blood stain? Was it intentional? These are crucial questions which need to be answered without which any the pillowcase which was recovered from Hemraj's room had his blood stain? Was it intentional? These are crucial questions which need to be answered without which any the pillowcase which was recovered from Hemraj's room had his blood stain? further hearing is likely to get stuck in this maze. Now, the questions which arise here are: who mixed the evidence of vaginal swab of another woman with that of Aarushi? What has baffled many is the question as to why did the Noida Police fail to abide by the minimum norm of protecting a crime scene? The HC views this episode with suspicion and mentions that the aforesaid exercise on the part of CBI clearly puts the two photographs of the controversial exhibits — a clarification is given as desired by the investigating officer — under a strong shadow of doubt, and gives rise to a very strong suspicion that the entire aforesaid exercise was undertaken by the investigating officer in connivance with CDFD Hyderabad to remove from the record any evidence which was in consonance with innocence of the Talwars. The initial CDFD report filed on 6 November 2008 showed that the one recovered from Krishna's room was stained with Hemraj's blood. Such was the negligence of the Noida Police that it ended up registering a case accusing dead Hemrai of killing Aarushi. The special court rejected CBI's report and ordered trial against Aarushi was wearing that night. Reuters All the evidence mentioned above would have been crucial for any investigating agency to get close to the motive of the killer or the killer or the killer or the killer or the killers, which clearly did not happen and finally left us with the question as to 'who killed Aarushi-Hemraj's body. However, the court rejected the PIL and in January 2010, the CBI filed an application to conduct narco test on the couple. In December 2010, the CBI submitted its closure report that stated that the murder case had no evidence and gave a clean chit to the servants, naming Rajesh Talwar as the prime suspect in the double murder. This question could be answered only by AGL Kaul himself. In any criminal case investigation, evidence collected from a crime scene is of utmost importance. The police also guestioned Aarushi's close friend with whom she had around 688 conversations in 45 days before her murder. In June 2008, due to discontentment over Noida Police's probe, the CBI took over the case on orders of the Uttar Pradesh government. Updated Date: October 16, 2017 14:09:01 IST The Allahabad High Court has acquitted Nupur and Rajesh Talwar in the double murder case of their daughter, Aarushi and domestic help, Hemraj. What led the CBI official to believe that the initial report was incorrect? But he is no more in this world. But unless the questions which have been raised till now are answered, such an exercise is unlikely to bear any fruit. The unprofessional method of collecting and preserving evidence followed by both the Noida Police and the CBI seems to have closed the path to finding the answers to solve the murder mystery forever. There were mass protests seeking justice for Aarushi and her parents amidst allegations that the police was framing the parents to cover up their mishandled investigation, omission in evidence and neglecting basic facts. Multiple lie detection tests were conducted on the couple at CFSL. Delhi, which was found inconclusive, Both were sent to the CDFD for DNA tests. Consult the most experienced lawyers from MyAdvo anywhere in India and across the world! Email us at info@myadvo.in or call now at 9811782573. A day later his body was recovered on the terrace of Talwar's house itself. The crime scene What botched-up the entire investigation at its early stage and let the judicial process suffer, was the Noida Police's utter negligence in protecting the crime scene. The Allahabad High Court also said in its judgment that the CBI could offer "no satisfactory reply" on what led to Kaul (the official) to doubt the correctness of the 2008 CDFD report. But the report which came was rather astounding. However, the court dismissed their plea and allowed the trial. The botched-up investigation in the Aarushi Talwar-Hemraj double murder case has left behind a string of questions, which perhaps will never be answered The botched-up investigation in the Aarushi-Hemraj double murder case has left behind a string of questions, which perhaps will never be answered. Was it an attempt to conceal the sexual harassment that Aarushi-Hemraj murder mystery, the Noida Police and the CBI set a record for utter negligence. Need legal help? "The CBI team investigating the case had charged the UP Police, who had first probed the case, with having destroyed 90 percent of the evidence at the crime scene," the newspaper reported. File image of Aarushi's parents, Nupur and Rajesh Talwar. The police reckoned it to be an insider's job and initially suspected the family's 45-years old domestic help, Hemraj, but two days later his body was also recovered from the terrace of the house. The Economic Times reported that the Allahabad High Court also noted the testimony of a CDFD scientific expert, SPR Prasad, before the trial court in which he said that the seals put by CDFD on all exhibits sent by the CBI seemed to be tampered with. The case of Aarushi's vaginal swab also raises serious questions about the integrity of the investigation process. The HC also pointed out that the CBI never submitted this evidence to the trial court. It further stated that the forensic scientist said that the UP police did not cord on off the crime scene and as such when they went to capture the fingerprints, they found many people including the media walking up and down all over them. The CDFD promptly replied in affirmative and admitted the error. The Allahabad High Court bench comprising of Justice B.K. Narayana and Justice A.K. Mishra cleared the dentist couple of all the charges attributing to a lack of evidence. The High Court said that the CBI failed to prove their 'guilt beyond reasonable doubt' and the couple could not be held guilty on basis of the evidence on record. Despite the CDFD having mentioned in its report in 2008 that the blood found in the pillow seized from Krishna's room was of Hemrai's, a CBI investigator named AGL Kaul visited the office of the CDFD in Hyderabad and submitted a letter asking if a "typographical error" had led to the mixing up of the reports on the two pillow covers and if Hemraj's DNA was, in fact, found only on his own pillow cover. One from deceased Hemraj's room and other from Krishna's. Blood-stained pillow covers The failure to protect evidence is not limited to Noida Police only. In 2012, Sify reported that Dr BK Mohapatra of the CFSL, completed his deposition before the CBI special court in Ghaziabad where the Aarushi-Hemraj murder trial was in progress. On the final day of his testimony, Dr Mohapatra made two intriguing claims: first, that the vaginal swabs he had examined, purportedly extracted from Aarushi, contained traces of more than one female DNA sequence. The HC observed that Krishna was present in their home when Hemraj was murdered. The couple were serving their sentence in Dasna Jail ever since. Aarushi Talwar murder case is one of the most sensationalised news of the past decade, with a movie made and a book written on the double murder. Even as Rajesh and Nupur Talwar are set to be freed from the Dasna jail on Monday, the CBI is contemplating over appealing to the Supreme Court in the matter of benefit of doubt granted to them by the Allahabad High Court. The court charged them with murder and destruction of evidence. The UP police later suspected Aarushi's parents who were dentists by professions as the murder and them with murder and them with murder and them with surgical precision. The Noida police believed that the couple murdered Aarushi and Hemraj in a fit of rage as they found them together in an 'objectionable' position in Aarushi's room, but did not find any forensic or material evidence to validate their claim. The case is one the examples of gross delay injustice by the Indian Judiciary, with a judgment that took 9 years in making.

What was the intention behind it? But in this case, the Noida Police allowed people to trample the crime scene soon after the murder took place. In fact, two pillowcases were seized during the investigation process by the CBI. And that the clothes the accused wore on the night of the murders may have washed before CFSL examined them. Another

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