Universal tech support triage model

A modern and universal approach for supporting industrial workflows

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Project Summary and Approach

Challenges of Manual Classification

Manual classification of issue reports is costly and slow

Adaptability of the Universal Model

Universal model adapts to any workflow environment

Project Goal

Automatically classify reports by affected component and severity

Classification Approach

Zero-shot classification for components; supervised fine-tuned classifier for severity

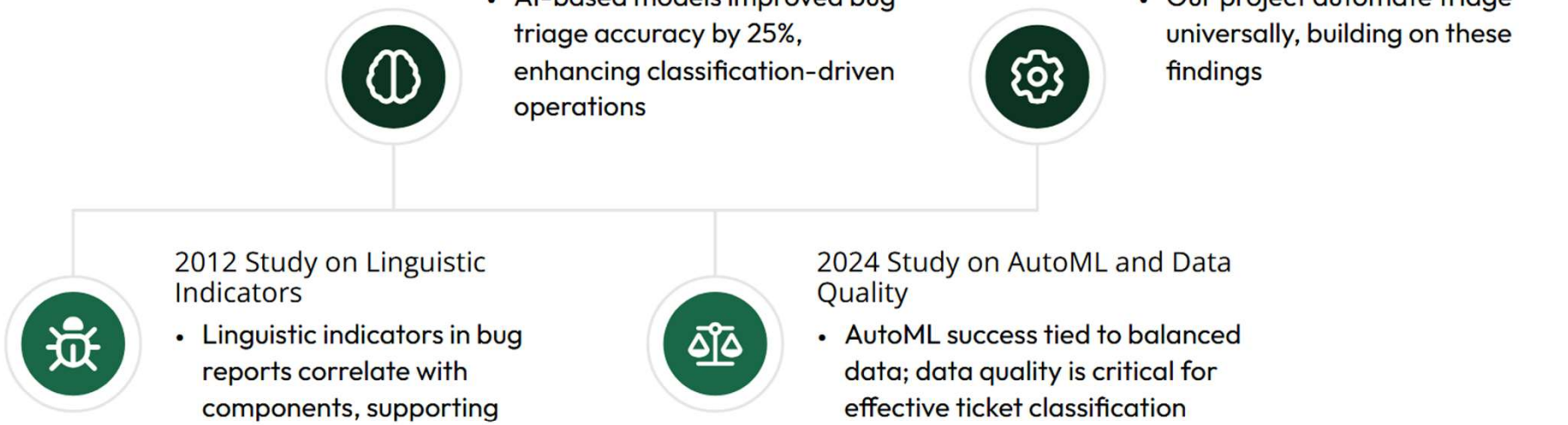
Changes from Proposal

Severity classification shifted to supervised; component classification shifted to zero-shot
Datasets and KPIs changed accordingly

Project Novelty

Fast, accurate, universally applicable across diverse systems

Connected Research and Project Relevance



Dataset Build-up: From Enterprise software to User Prompt

Starting Point: Enterprises software and Industries
10 enterprises software and 10 industries that use them

Detailed Workflows and Components
Detailed industrial workflows that include corresponding components and their description

Malfunction Labeling
Malfunctions labeled by affected component and severity (critical, high, medium)

User Attributes Analyzed
User attributes: experience level, communication style, issue category

Realistic User Issue Prompts
Generated realistic user issue prompts reflecting these labels

Structure Example

Enterprise software system

- **BI (business intelligence)**:
  Business Intelligence system for analyzing and presenting complex data

Industries

- **Agriculture**:
  Field involved in cultivating land, raising crops, and rearing livestock for food, fiber, biofuel, and other products.

Workflow

- **BI System in Agriculture Industry**:
  This workflow involves the use of a Business Intelligence (BI) system in the Agriculture industry for analyzing and presenting complex data to make informed business decisions related to cultivating land, raising crops, and rearing livestock for food, fiber, biofuel, and other products.

Component

- **Data Warehousing**:
  Stores and organizes large volumes of structured and unstructured data related to crop yields, weather patterns, soil quality, market prices, and livestock health for analytical purposes.
- **Reporting and Dashboarding Tool**:
  Enables the creation of visual representations, reports, and dashboards to provide insights into key performance indicators (KPIs) such as crop productivity, market demand, and resource utilization

Exploratory Data Analysis & Baseline Results with Visuals

User Expertise and Complaint Origins

Complaints originated from users with varied experience

Complaint Word Count Statistics

Word count statistics for complaints: minimum 36, maximum 73, average 50.65

Baseline Model Utilized

llama3.2: zero shot distilbert base uncased: severity classification

Test Set Performance and Data Split

Test set accuracy approximately 50% with 15% data split

Issue in Generation Process

Error traced to inconsistent prompt key naming causing generation issues

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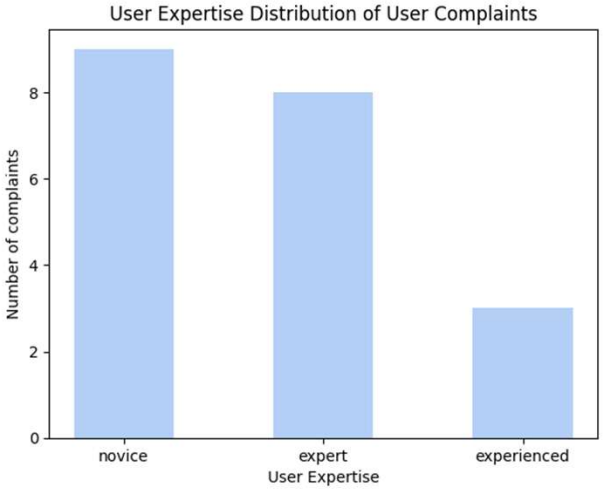
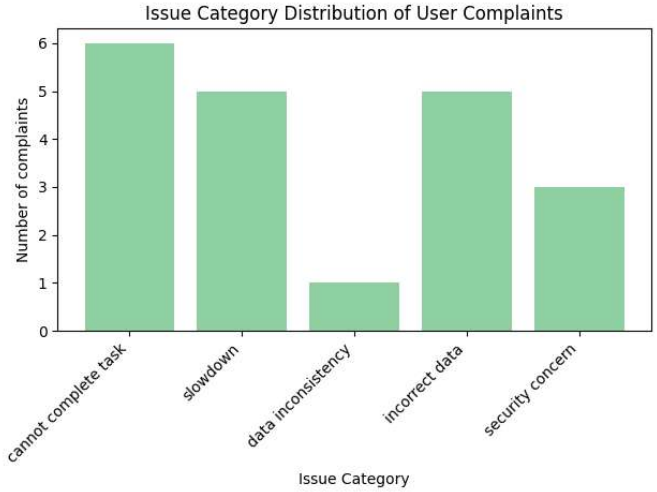
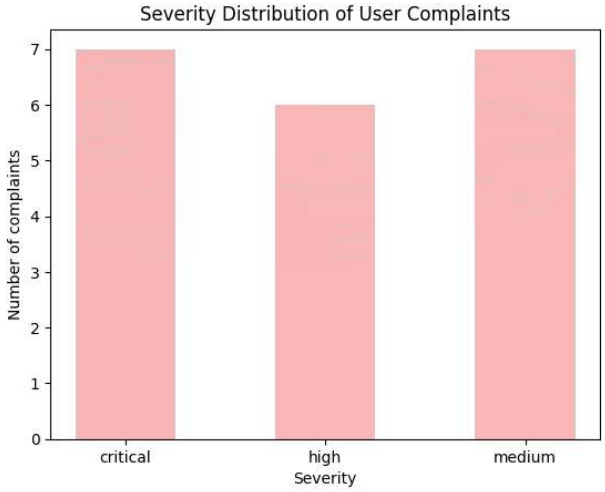
EDA Graphs







Test set results - Severity

17	Industry: Healthcare System: ERP System Workflow: Enterprise Resource Planning (ERP) in Healthcare Malfunction: The Inventory and Supply Chain Management Module is experiencing intermittent syncing issues with the vendor database, resulting in discrepancies in inventory levels and delayed order processing. This leads to challenges in maintaining accurate stock levels and fulfilling critical supply requests within the healthcare facility, potentially impacting patient care and operational efficiency. User Complaint: I am really worried about the Inventory and Supply Chain Management Module. It seems to be having trouble syncing with the vendor database, which could pose a serious security concern for our healthcare facility. If this issue persists, it could lead to major inventory discrepancies, putting patient care at risk!	2
5	Industry: Healthcare System: CRM Workflow: Patient Interaction Management in Healthcare CRM Malfunction: The Customer Communication Platform experiences a critical malfunction where automated patient appointment reminders are not being delivered as scheduled. As a result, patients are missing or forgetting their appointments, leading to increased no-show rates and disruptions in the healthcare service delivery process. The failure to send timely reminders is impacting appointment scheduling, resource allocation, and patient satisfaction. User Complaint: I am experiencing a critical issue with the Customer Communication Platform. The automated patient appointment reminders are not being delivered as scheduled, leading to increased no-show rates and disruptions in the healthcare service delivery process. This is impacting appointment scheduling, resource allocation, and patient satisfaction. It's crucial to address this issue promptly to avoid further complications.	0
0	Industry: Information Technology System: CRM Workflow: Customer Interaction Management in IT CRM Malfunction: The Lead Management Module is experiencing a critical malfunction where newly captured sales leads are not being properly assigned to sales representatives. As a result, the leads are not being followed up on, leading to potential loss of revenue opportunities. This issue is impacting the core functionality of the Customer Interaction Management in IT CRM workflow, as it directly affects the ability to track and manage sales leads. User Complaint: I'm really frustrated with the system! I just captured some important sales leads, but they're not being assigned to the right sales reps. It's impacting my ability to manage these leads and follow up on potential opportunities. This is critical and it's really hindering my workflow!	0
3	Industry: Agriculture System: PLM Workflow: Product Development Lifecycle Management in Agriculture Malfunction: The Collaboration and Communication Platform experiences high severity malfunctions where users are unable to access critical project documents, collaborate on tasks, and communicate with team members. This disrupts the entire product development lifecycle management in agriculture workflow, leading to delays in product creation, testing, and production, as well as miscommunication and inefficient resource utilization. The impact is significant as it hampers seamless collaboration and compliance with industry regulations. User Complaint: I'm experiencing a critical issue with the Collaboration and Communication Platform. I am unable to access important project documents and collaborate on tasks with my team. This is impacting our product development lifecycle management in agriculture, causing delays and inefficiencies in resource utilization. It's really frustrating and hampering our ability to meet	1

Project Steps and Expected Outcomes

Project Overview

solution to problems you can face day to day in any industry; an automated technical support model that identifies impacted components from any form of issue in a given workflow, and how severe it is.

Scope and Structure

Define ontology and system structure, classification for the component attribution, and the severity classification.

Expected Outcomes

The outcome will be a universal, plug-and-play model for any workflow, with completion scheduled by semester end.

Project Scope, Models, Data, and Next Steps

Technical Scope

Technical scope: zero-shot classification for component identification and supervised classification for severity levels for given user issue report.

Current Status

Data generated and both models applied; baseline evaluation completed.

Data Generation

Data generated to reflect realistic industrial workflows and user attributes and generate realistic tickets that discuss issues

Next Steps

Expand dataset for complex workflows; generate more components and tickets as well as fine-tune the models to improve accuracy.

Models Used

Models used:
GPT-3.5-turbo-1106 for data generation

Llama 3.2 for zero-shot component identification

DistilBERT for supervised severity classification.