**PROJECT PROPOSAL**

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| **Date of proposal: 09/10/2023** |
| **Project Title: SudokuPix Web-based Sudoku Solver** |
| **Group ID (As Enrolled in Canvas Class Groups):**  Group 8  **Group Members (name , Student ID):**  Li Hangyu, A0243828X  Zhang Shihan, A0285685J  Zhou Zean, A0285913W  Zhang Cailei, A0265072H |
| **Sponsor/Client:** *(Company Name, Address and Contact Name, Email, if any)*  *None* |
| **Background/Aims/Objectives:**  The upsurge of interest in puzzle-solving and intelligent systems has fueled a demand for innovative platforms that integrate visual recognition, problem-solving, and user interaction seamlessly. This project aims to design and develop a web-based platform that can accurately recognize, solve, and provide feedback on Sudoku puzzles presented in image format. Users can upload images of Sudoku puzzles at various stages of completion. The platform will complete unfinished puzzles, verify the solutions of finished or partially completed puzzles, differentiate between handwritten and printed digits, and provide corrected versions of the puzzles. |
| **Project Descriptions:**  "SudokuPix" is a project aiming to design a web-based platform to interactively engage users with Sudoku puzzles through image upload. The primary focus lies in image processing and recognition, employing neural networks among other methods. The various modules encompassed in this project are detailed below:   1. **Image Pre-processing Module**:   Initial processing of the uploaded images is critical for the success of the subsequent recognition tasks. This module applies a set of filters to improve image clarity and delineate the Sudoku grid.  Geometric corrections are performed to rectify any distortions in the grid image, preparing a standardized image for further analysis.   1. **Model Training Module**:   A substantial dataset comprising both handwritten and printed digits is utilized for training models.  The process aims to achieve a reliable level of accuracy in distinguishing between different types of characters in the uploaded images.   1. **Recognition and Solution Module**:   Individual cells within the Sudoku grid are scrutinized for digit recognition, identifying whether the digits are handwritten or printed.  After the digits are recognized, solve the Sudoku puzzle.   1. **Feedback and Correction Module**:   Incorrect or missing entries are highlighted, and correct solutions are provided.  A corrected image of the Sudoku puzzle is generated and prepared for delivery back to the user.   1. **User Interface**:   A simple yet effective web interface is developed for users to upload images of Sudoku puzzles.  The interface facilitates smooth interaction and provides the user with the corrected image along with any necessary feedback regarding their input. |