Project Plan

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| **WP#** | **Work Package Title** | **Leader** | **Members Involved** |
| **WP1** | Preparing Pollen Dataset | İrem Tekin | Ömer Ünlüsoy |
| **WP2** | Preparing the Pollen Extraction Algorithm | Umut Ada Yürüten | İrem Tekin |
| **WP3** | Transfer Learning Process | Ömer Ünlüsoy | Elif Gamze Güliter |
| **WP4** | Data Augmentation Process | Elif Gamze Güliter | İrem Tekin  Ece Ünal  Ömer Ünlüsoy |
| **WP5** | Preparing the First CNN Model | Ömer Ünlüsoy | Umut Ada Yürüten  Ece Ünal  İrem Tekin  Elif Gamze Güliter |
| **WP6** | Backend of the Pollividis Website | Ece Ünal | İrem Tekin  Ömer Ünlüsoy |
| **WP7** | Finalizing the CNN Model | Ömer Ünlüsoy | Ece Ünal  Elif Gamze Güliter  Umut Ada Yürüten  İrem Tekin |
| **WP8** | Front-end Implementation and Integration with Google Maps API | İrem Tekin | Ece Ünal  Umut Ada Yürüten |

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| **WP1:** Preparing Pollen Dataset | | | |
| **Start Date:** 4 October 2021 | | **End Date:** 24 December 2021 | |
| **Leader:** | İrem | **Members Involved:** | Ömer |
| **Objectives:** 30-35 pollen species will be collected. 200-500 photographs will be taken for each species. It will serve for both our model and feature researches. | | | |
| **Tasks:**  **Task 1.1:** Photograph each species at Ankara University Palynology Laboratory. | | | |
| **Deliverables:**  **D 1.1:** Dataset consisting of30-35 pollen species with 200-500 photos | | | |

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| **WP2:** Preparing the Pollen Extraction Algorithm | | | |
| **Start Date:** 25 October 2021 | | **End Date:** 25 November 2021 | |
| **Leader:** | Umut Ada | **Members Involved:** | İrem |
| **Objectives:** To implement a pollen extraction algorithm to extract each pollen photo separately from a given sample. | | | |
| **Tasks:**  **Task 2.1:** Search the existing extraction algorithms.  **Task 2.2:** Implement a pollen extraction algorithm in Python.  **Task 2.3:** Implement a main class for pre-training process which will take samples from file directories, prepare them for the model, and call the model’s predict function. | | | |
| **Deliverables:**  **D 2.1:** Pollen extraction algorithm to extract pollens from samples before CNN  **D 2.2:** A main class for pre-training process | | | |

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| **WP3:** Transfer Learning Process | | | |
| **Start Date:** 25 October 2021 | | **End Date:** 14 March 2022 | |
| **Leader:** | Ömer | **Members Involved:** | Elif Gamze |
| **Objectives:** Using a pre-trained model to increase our model’s accuracy due to the shortage of our dataset. | | | |
| **Tasks:**  **Task 3.1:** Search available pre-trained models (like VGG-19), and decide the one to use in our model.  **Task 3.2:** Implement the first version of transfer learning for our model in PyTorch.  **Task 3.3:** Run several tests to evaluate the compatibility of the pre-trained model.  **Task 3.4:** Adjust the hyperparameters of the model to increase accuracy.  **Task 3.5:** Finalize the pre-trained model with small adjustments. | | | |
| **Deliverables:**  **D 3.1:** Pre-trained model with hyperparameter adjustment | | | |

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| **WP4:** Data Augmentation Process | | | |
| **Start Date:** 25 October 2021 | | **End Date:** 27 November 2021 | |
| **Leader:** | Elif Gamze | **Members Involved:** | İrem, Ece, Ömer |
| **Objectives:** Finding the applicable Data Augmentation methods for our model to increase the dataset size and decrease overfitting. | | | |
| **Tasks:**  **Task 4.1:** Search the Data Augmentation methods and decide which ones are suitable for our model and dataset.  **Task 4.2:** Implement the data augmentation (transformation) in PyTorch. | | | |
| **Deliverables:**  **D 4.1:** Data Augmentation (transformation in PyTorch) | | | |

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| **WP5:** Preparing the First CNN Model | | | |
| **Start Date:** 15 November 2021 | | **End Date:** 15 December 2021 | |
| **Leader:** | Ömer | **Members Involved:** | Umut Ada, Ece, İrem, Elif Gamze |
| **Objectives:** Implement the first version of Pollen Classifier CNN model. | | | |
| **Tasks:**  **Task 5.1:** Each team member will learn the neural network and PyTorch basics.  **Task 5.2:** Search similar CNN model implementations to get an idea about the required structure of the model.  **Task 5.3:** Implement the first version of convolutional, max pooling, and fully connected layers with PyTorch Sequential.  **Task 5.4:** Implement Trainer class.  **Task 5.5:** Implement Tester class. | | | |
| **Deliverables:**  **D 5.1:** CNN class  **D 5.2:** Trainer class  **D 5.3:** Tester class | | | |

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| **WP6:** Backend of the Pollividis Website | | | |
| **Start Date:** 15 October 2021 | | **End Date:** 14 March 2022 | |
| **Leader:** | Ece | **Members Involved:** | İrem, Ömer |
| **Objectives:** Implement the project backend for database, ML model, and UI connections in Python Django. | | | |
| **Tasks:**  **Task 6.1:** Each involved team member will learn the basics of Python Django framework which we will use to implement PolliVidis website backend.  **Task 6.2:** Implement the database with SQL.  **Task 6.3:** Connect the Django backend of the project with the initialized database.  **Task 6.4:** Implement query functions which will upload and request samples from the datasets.  **Task 6.5:** Connect the backend with the ML model.  **Task 6.6:** Implement the function that will produce the analysis report using ML model classification.  **Task 6.7:** Connect the backend with the user interface of PolliVidis. | | | |
| **Deliverables:**  **D 6.1:** Database Implementation with SQL  **D 6.2:** PolliVidis Backend | | | |

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| **WP7:** Finalizing the CNN Model | | | |
| **Start Date:** 15 December 2021 | | **End Date:** 10 April 2022 | |
| **Leader:** | Ömer | **Members Involved:** | Ece, Elif Gamze, Umut Ada, İrem |
| **Objectives:** To finalize the implemented CNN model with proper tests, hyperparameter adjustments, and several optimizations. | | | |
| **Tasks:**  **Task 7.1:** Implement different versions of the first CNN with different pre-trained models.  **Task 7.2:** For each implementation, run several tests and adjust hyperparameters to increment the evaluation matrices including accuracy.  **Task 7.3:** Compare each implementation and decide the final structure of the model. | | | |
| **Deliverables:**  **D 7.1:** CNN model | | | |

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| **WP8:** Front-end Implementation and Integration with Google Maps API | | | |
| **Start Date:** 15 November 2021 | | **End Date:** 10 April 2022 | |
| **Leader:** | İrem | **Members Involved:** | Ece, Umut Ada |
| **Objectives:** To implement the user interface of PolliVidis. | | | |
| **Tasks:**  **Task 8.1:** Each involved team member will learn HTML, React basics.  **Task 8.2:** Implementation of each mockup.  **Task 8.3:** Integration of Google Maps API.  **Task 8.4:** Final adjustments between user interface, backend, and database. | | | |
| **Deliverables:**  **D 8.1:** User Interface of each PolliVidis page | | | |