

METU, Department Of Computer Engineering  
Graduation Project  
Proposal Form

## Project Information

### Title

Development of a Forecasting and Warning System on the Ecological Life-Cycle of Sunn Pest

### Target

Public ☐ Restricted ☒

## Proposer Information

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## IP (Intellectual Property) Information

Subject to the consent of The Ministry of Food, Agriculture and Livestock of The Republic of Turkey

## Project Description and Background Information

### Description

This project will especially be developed for the “Sunn pest” which is a wheat pest. This insect spends its life time in two different areas that are called “kışlak” and wheat field. It migrates to field from “kışlak”. After migration, the wheat field should be sprayed at a certain growing phase of the insect. The Ministry of Agriculture has devices (weather stations) in both “kışlak” and wheat field. These devices have already deployed and functional in 800 locations. They give very detailed information about physical conditions such as temperature, humidity. The project will decide the spraying date by applying machine learning algorithms on this data.

### Similar Products/Projects

There is no similar project available.

## Justification of the proposal

This project aims to estimate the spraying date of the sunn pest. Thanks to this project, agricultural engineers do not have to count sunn pests in fields to determine the spraying date. This counting process is very hard and open to human errors. It takes almost three months for the engineers on the road. This method is too primitive for today's technology. Therefore, this project will save money and human effort. Also, it will provide exact date of spraying.

## Contributions, Innovation and Originality Aspects of the Project

The main innovation of this project is enabling farmers to learn exact date of spraying. Sunn pest's habitat is Middle East and this project will be a unique solution for this specific problem. This will be one of the earliest applications of machine learning algorithms in agriculture in Turkey. Therefore, it will trigger further agricultural research in Turkey.

## Technical Aspects of the Project

These parts below will be developed with the scope of the project.

- A mobile and web application that collects, transmits, and presents results to engineers by pulling out the results and archived statistics from the server.
- A data warehouse and web-based server application (including maps and sms modules) similar to the infrastructure in the Agro Intelligence project (but to be designed in a different structure)
- Applying Machine Learning and Deep Learning algorithms to analyze visuals in such a way that they produce accurate results. (Testing and optimizing parameters of what??)
- Software that extracts statistics from visuals both automatically and decision-support levels (ability to manipulate admin modules, inputs, parameters and output manually)
- All the data and domain expertise will be provided by the team we are in contact with (the insect specimens that are identified or will be identified, photos ,sample training data(count of sunn pest in fields) , test data, etc.)
- Reporting and archiving of results, searching in archives according to various criteria

## Targeted Output, Targeted User/Domain Profile

The end product will consist of the software parts that estimate the spraying dates and a web application that shows the detailed information about spraying process. This project can be used by Republic of Turkey Ministry of Food, Agriculture as a package module to the devices in the fields. Also, farmers and agricultural engineers are possible users of the product.

## Project Development Environment

Weather Stations (Already deployed and functional)  
Web Services (Provided by METOS)  
Web Development Tools (Html, Css, Js, JQuery, Mustache, Php, MySQL, Bootstrap, ...)  
ML Tools (Weka, TensorFlow, ...)  
Java  
Hosting Service

## External Support

The data will be provided by the devices of Republic of Turkey Ministry of Food, Agriculture. The stage of developing algorithms will be supported by agricultural engineers from the ministry.

## References

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