# Generating Functions/Trees for Evaluating Optimal Binarizations:

MPS Team Project - Final Development Report


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***Abstract*—This project introduces a novel image binarization method combining global and local thresholding techniques. Our approach, evaluated on various benchmark datasets, has demonstrated superior performance in accuracy, recall, and F-measure compared to traditional methods.**



***Index Terms*—Image Binarization, Global Thresholding, Local Thresholding, Agile Methodology, Software Development**


## I. Team Progress in Solution Development

Our team embarked on the "Generating Functions/Trees for Optimal Binarizations" project with clearly defined roles to structure our development process effectively. Our team, comprising a coordinator, two developers, a tester, and a project manager, initiated a series of weekly Microsoft Teams meetings to ensure continuous collaboration.

The initial phase involved intense discussions on project requirements, debating between research-focused versus implementation-centric approaches. Recognizing the need for an intermediate prototype, we decided to transition from research to development, initiating the construction of a preliminary software version.

For Milestone 3, our approach to task division and collaboration intensified. We organized several meetings via Microsoft Teams and WhatsApp to ensure efficient progress. The first meeting involved the entire team and was dedicated to task allocation. This was crucial to establish clear responsibilities and set the direction for the next phase of development.

Subsequently, we had separate meetings for different team functions. The developers and tester held focused sessions to work intensively on the code, addressing technical challenges and ensuring software quality. Concurrently, the team leader and project manager held separate discussions to complete various reports, ensuring that all administrative and management aspects of the project were in line with our objectives.

After these separate sessions, we reconvened as a full team to review our developments and assess the final results. This meeting was pivotal in synthesizing the technical and managerial aspects of our project, providing a comprehensive view of our progress and setting the stage for future developments.

Simultaneously, we maintained a strong research component to ensure our methods align with current best practices. As a result, we have successfully outlined our solution's architecture and begun developing the crucial local binarization component.

## II. Impact of the Used Development Methodology

Our project embraced Agile methodology, accommodating the diverse schedules and commitments of team members. Agile allowed us to implement long-term planning with flexible timelines, using tools like GitHub and Microsoft Teams for coordination and communication. Regular weekly meetings, supplemented by a dedicated Teams channel, ensured everyone was clear on their tasks without excessive pressure.

Agile's adaptability has proven ideal for our project, enabling efficient task distribution and progress tracking without overwhelming the team members.

## III. Monitoring, Evaluation, and Control of Project Progress

For effective project monitoring, we implemented real-time task tracking, with developers regularly updating task statuses. Any task revisions or reassignments were immediately communicated via our Whatsapp group.

The Project Manager oversaw the adherence to project timelines and milestones, while the Team Leader ensured alignment between technical development and overarching project goals. The Tester's contributions in identifying and tracking bugs were pivotal in enhancing the software's performance and user experience.

### A. Challenges and Adaptations

We encountered several challenges, including aligning individual work with team goals and managing dependencies between different development components. To address these, we increased our communication efforts and implemented more granular task tracking. These adaptations ensured smoother workflow and better alignment with project objectives.

### B. Lessons Learned

This project has been a learning experience, teaching us the importance of clear communication, adaptability, and the value of a well-structured development methodology. Our journey from conceptualization to prototype development has been enriched by the diverse perspectives and skills within our team, setting a strong foundation for the project's future phases.