CS 520 Project Proposal

Graph-based Segment Selection for Bird Song Syllables
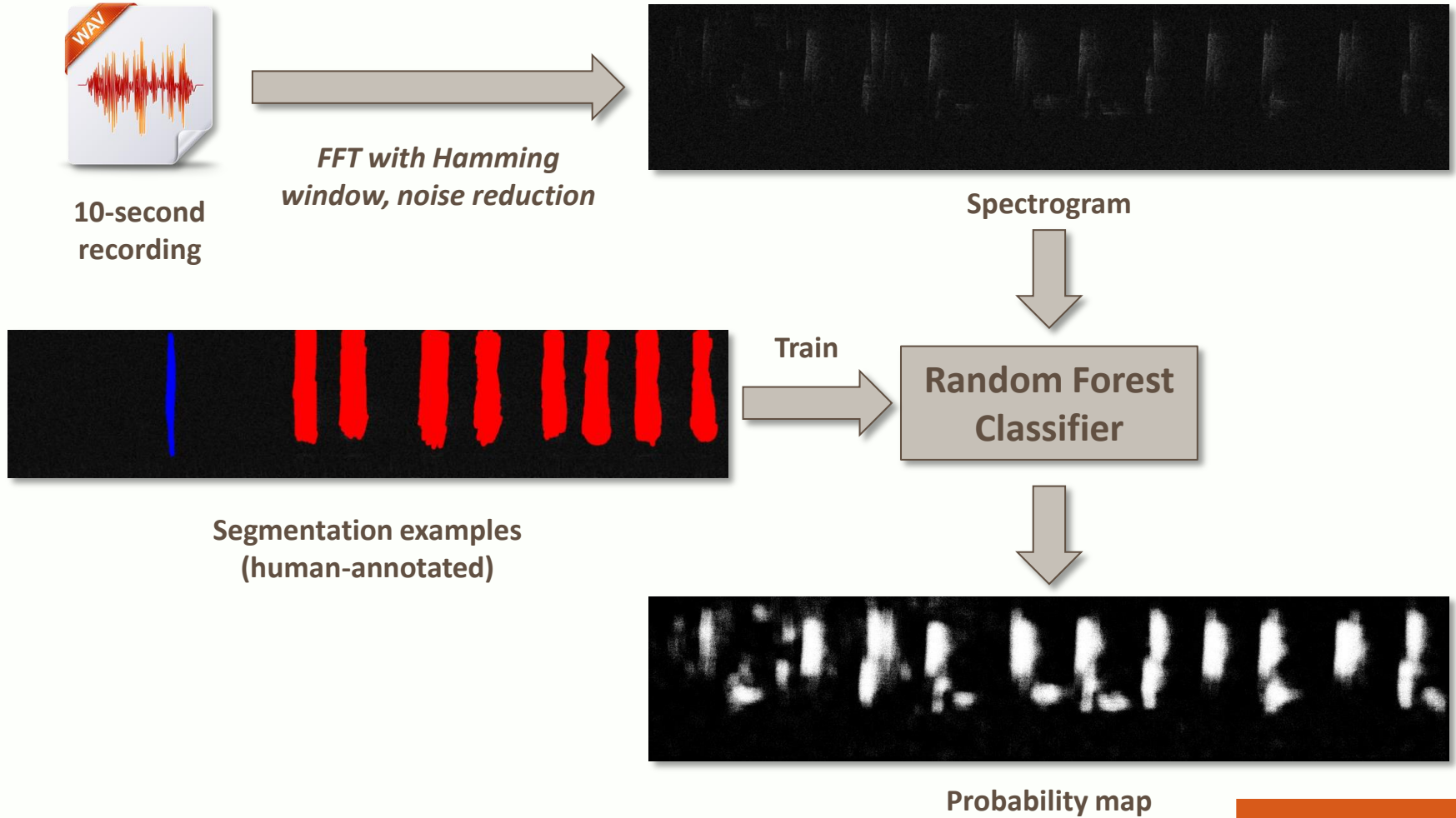
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Introduction

- **OSU Bioacoustics** project aims to understand bird populations in H. J. Andrews forest.
  - *Bioacoustics* studies animal vocalization to asses biodiversity.
  - Birds behavior reflect critical environmental changes globally and locally.
- Recordings are obtained under <u>real-world conditions</u>.
  - A lot of noise with different levels.
- Aim: to classify bird species and detect bird song syllables.
- Previous works: bird song segmentation and classification.
- Current goal: **to improve segmentation results**.
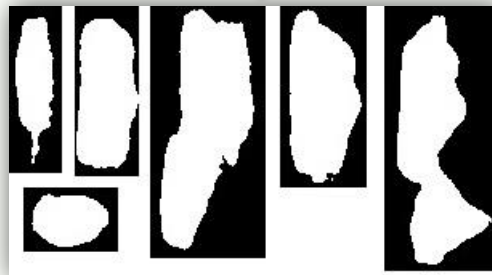 - This is expected to lead to better classification results.

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Previous Works

10-second recording

FFT with Hamming window, noise reduction

Spectrogram

Segmentation examples (human-annotated)

Train

Random Forest Classifier

Probability map

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Probability map

Fixed threshold!

Binary mask

Connected component extraction

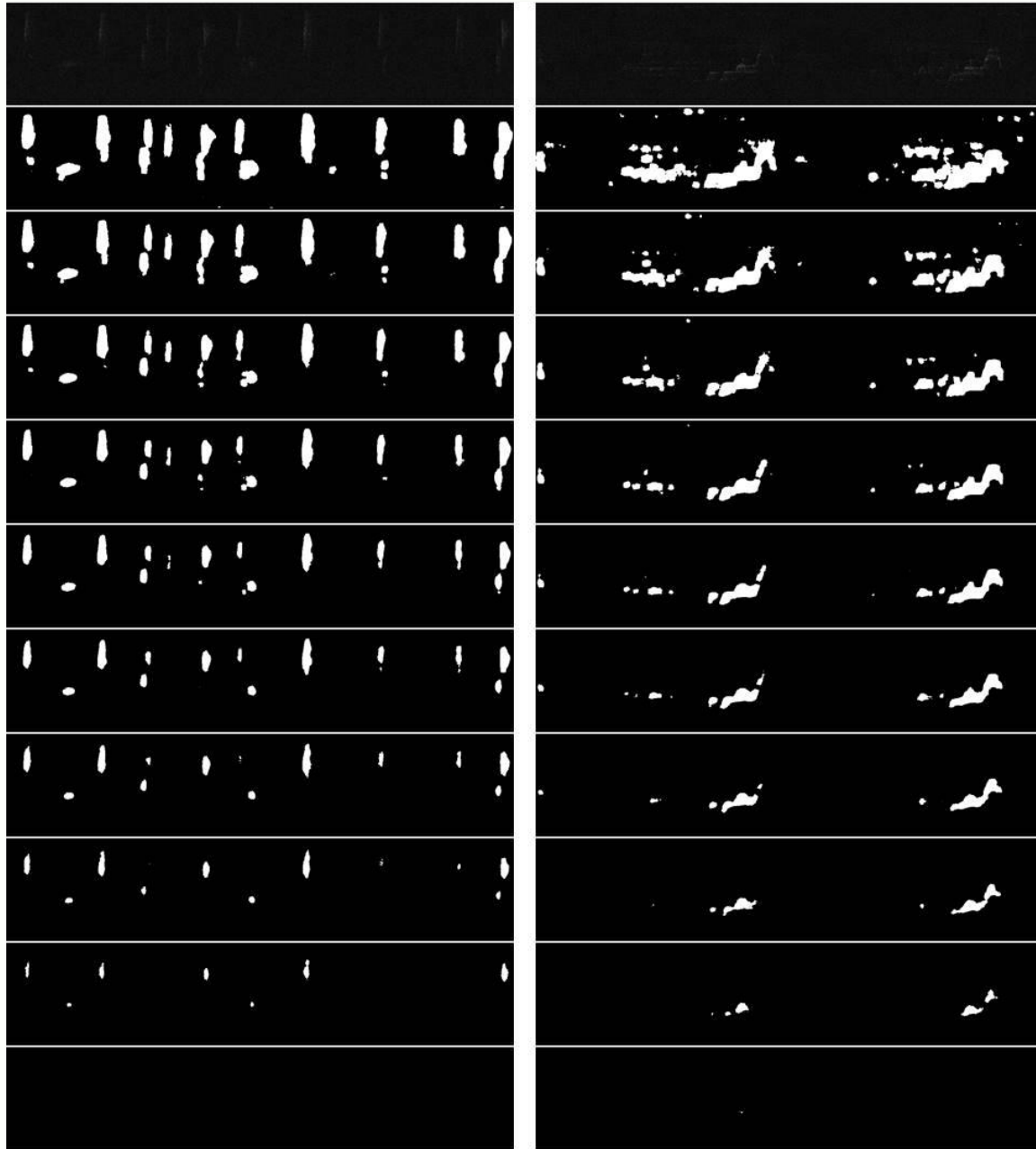**Oregon State**
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Current Approach

Probability map

Multiple thresholds
n binary masks

Which segments should be extracted?

A regression model is used to predict the quality of each segment.

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**Sample
Binary Masks**

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Problem Statement

- Segmentation hierarchy can be viewed as a forest.
- Current selection algorithm extract a subset of segments from the hierarchy that **maximizes the overall quality**.
- **Proposal**: analyzing and evaluating different formulations for segments selection.
  - Assign weights to edges between nodes (segments) and formulate it as a graph problem.
  - Construct a graph, not necessarily a forest, from the hierarchy, then treat the problem as a path-finding problem.

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