

Whistle-Controlled Drone: Real-Time Human–Drone Interaction via Audio & AI

Project Concept

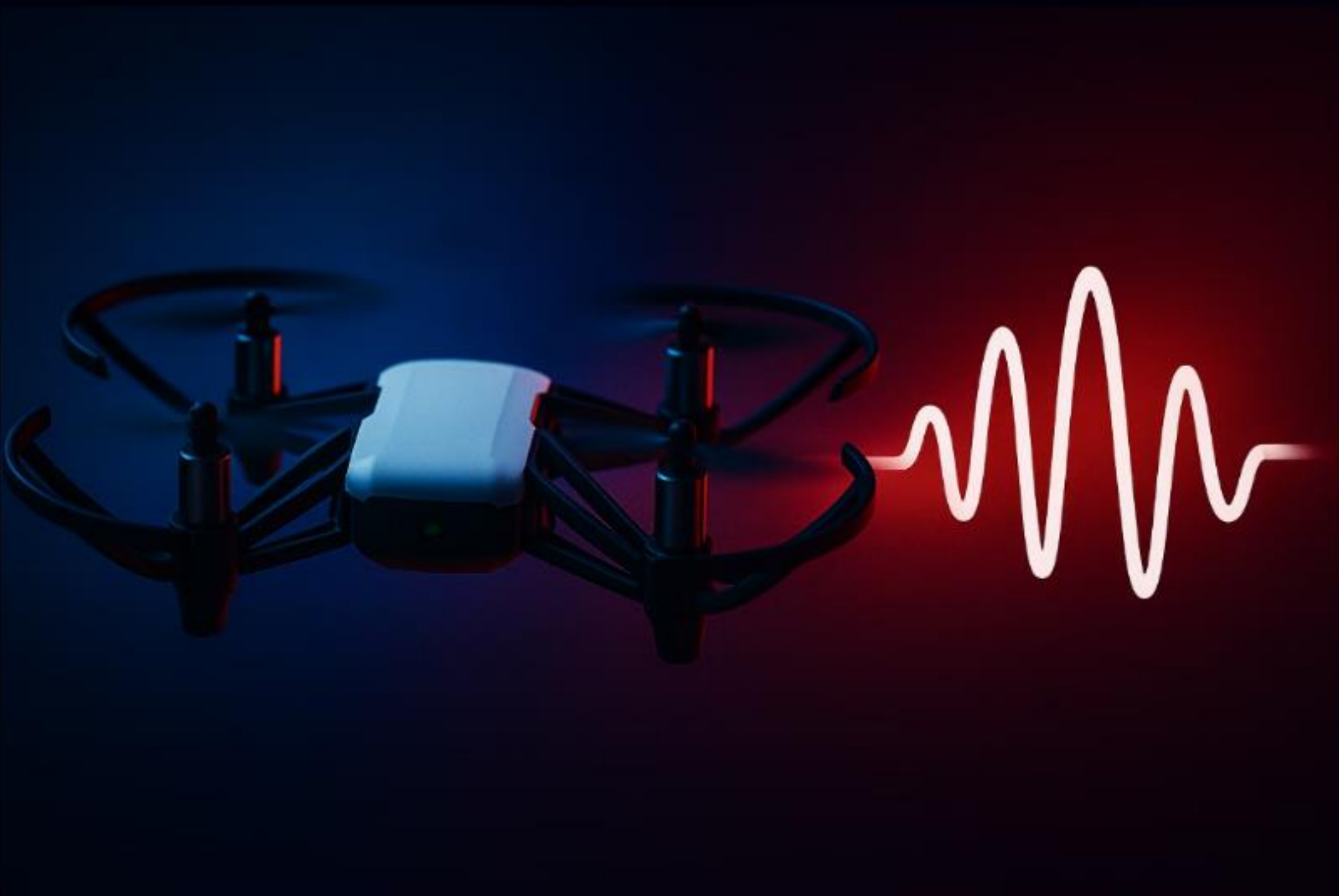
Inspired by "Yondu's arrow" from "Guardians of the Galaxy", a DJI Tello drone responds exclusively to the pilot's whistle. The system processes real-time audio, converting it into precise, hands-free flight commands.

Technical Challenges

- Converting whistles into smooth, accurate 3D flight control.
- Eliminating speech, background noise, and irrelevant sounds.
- Identifying the pilot's unique whistle in real-time amidst other sounds.

Command Mapping

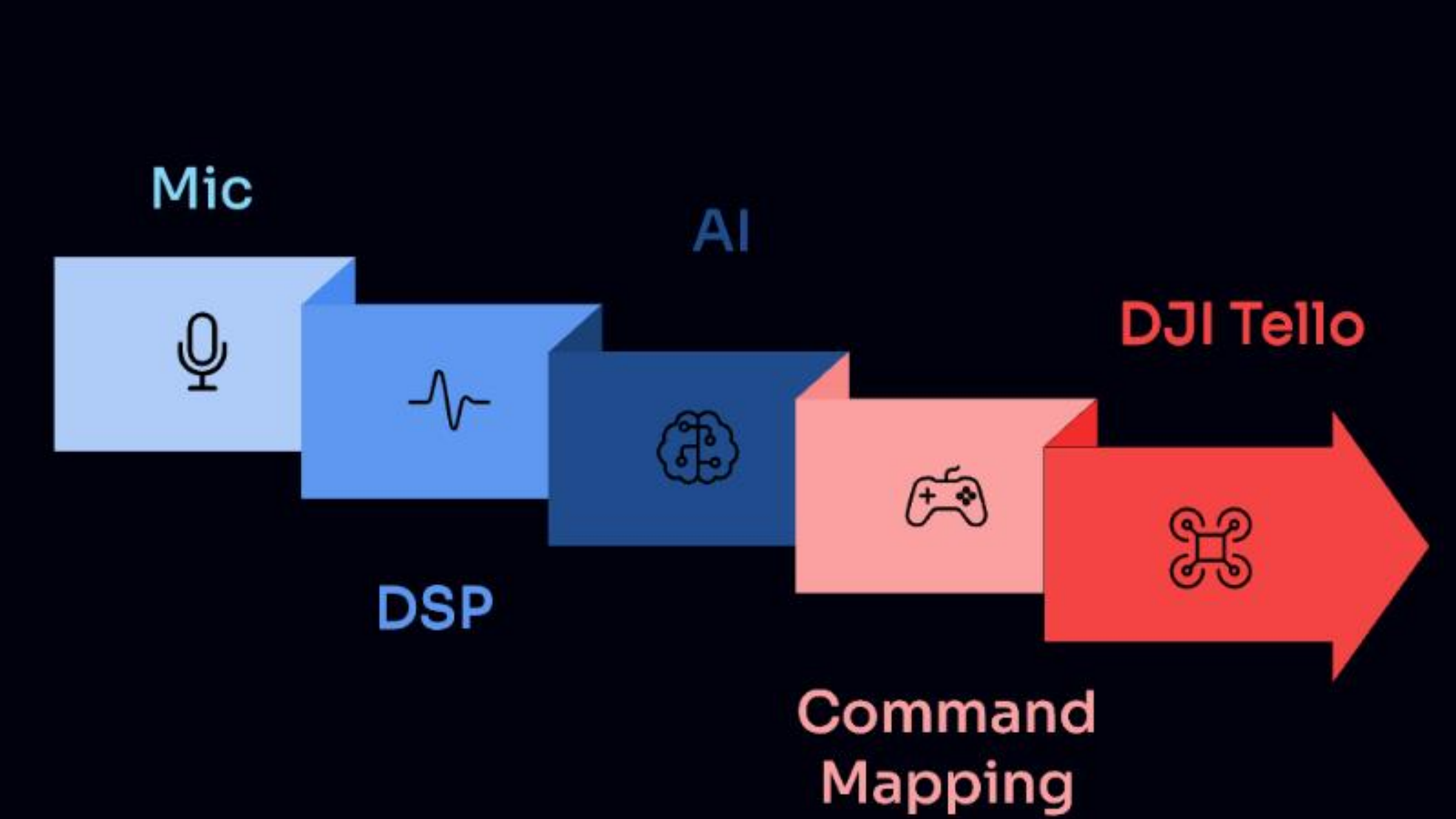
Forward speed	Pitch <ul style="list-style-type: none">• Lower pitch → Slower forward movement• Higher pitch → Faster forward movement
Altitude	Volume <ul style="list-style-type: none">• Softer volume → Drone descends• Louder volume → Drone ascends
Rotation	Pitch Change <ul style="list-style-type: none">• Low pitch to high pitch → Rotate right• High pitch to low pitch → Rotate left



Filtering System

- **DSP Stage:** Band-pass filtering and pitch/volume extraction for whistle-like sounds.
- **AI Stage:** Neural network classifier ensures only the pilot's whistle is accepted, rejecting others.

Pipeline Diagram



Testing & Results

- ~80% accuracy distinguishing the pilot's whistle from others.
- Stable, responsive control even in noisy environments.