LUIS App Exports

These exports can be imported to get the LUIS application used in this work. This can be achieved in the applications overview at https://www.luis.ai/applications. After importing, the model must me manually trained and published in LUIS.

Versions

- **0.1**: Intents are trained with machine learned entities and subentities.
- **0.2-features**: Like 0.1 but intents have machine learned entities as ML-Features.
- **0.2-entities**: Like 0.1 but with additional (separate) list and regex entities to help identify intents.
- **0.3**: Combination of 0.2-features and 0.2-entities.
- **0.4**: The list and regex entities are assigned to machine learned entities as ML-Features.

Definition of Version 0.4

Intents

Intent	Features	Utterances
Contact	MLContact	- olympic 072 contact nattenheim 135.4 - alitalia 5f contact milano 12585 bye - cross air 269w contact marseille on 125.85 good bye - sabena 4ad contact rhein frequency 132.4 tschuss - air berlin 5081 geneva 13315 - air hamburg 2546 marseille - alitalia 401 zurich 134.6 - french air force 4234 reims 134.4 good bye - hapag lloyd 355 zurich frequency 1337 tschuss - swissair 9360 contact rhein radar 127.37
FlightLevel	MLFlightLevel	- swiss 806 identified climb now flight level 340 - alitalia 851c buongiorno maintain level 320 - olympic 087 identified maintain flight level 350 - aegean 87h descend now level 300 - iberia 3473 bonjour climb to flight level 390 - cross air 512 bonjour cleared kines st prex fribourg flight level 310 - general motors 4209 continue descent to level 340 - lufthansa 4416 climb flight level 290 - luxair 2663 bonjour continue climb to flight level 350 - united 69 descend to flight level 290 - aero lloyd 517 good morning maintain flight level 320 - airfrans 3261 climb to flight level 340 - bonjour swissair 687 maintain flight level 280
None		- app developers drink coffee - music is categorized into genres - trampolines are mostly played with by kids - penguins are animals - trains on tracks

Intent	Features	Utterances
Squawk	MLSquawk	- good evening olympic 2d squawk 6751 - alitalia 210z squawk 4673 - swiss 213k good evening squawk 8315 - good afternoon sabena 63w squawk 1499 - airfrans 016 bonjour squawk 6784 - bonjour alitalia 228 squawk 5772 - air malta 104 good afternoon squawk 5730 - lufthansa 4356 good morning squawk 2712 - good morning adria 1642 squawk 2710
Turn	MLTurn	- lufthansa 6b turn now left to dkb - air portugal 41ac turn right 10 degrees - aero lloyd 560 further left by 10 degrees - alitalia 292 turn right to nattenheim - ltu 1602 right by 20 degrees please - hapag lloyd 171 turn left to bilsa - jet set 207 left direct hochwald - french lines 9165 fly heading 095 - lufthansa 5504 turn right heading 200 - olympic 144 turn left heading 115 for separation

Entities

Machine Learned

Entity	Sub-Entity	Feature
MLCallSign		
├──	Model class library used by multiple solutions (C# .NET 5)	ListAirlines
└──	FlightNr	
MLContact		ListContactIdentifiers
├──	Frequency	RegexContactFrequency
└──	Place	geographyV2
MLFlightLevel		
├──	Level	RegexFlightLevel
└──	Instruction	ListFlightLevelInstructions
MLSquawk		
└──	Code	RegexSquawkNr
MLTurn		
├──	Direction	ListTurnDirections
├──	Degrees	RegexTurnDegrees
│	└── Value	

Entity	Sub-Entity	Feature
├──	Heading	RegexTurnHeading
│	└── Value	
└──	Place	RegexTurnPlace
	└── Value	

Regex

- RegexContactFrequency: (\d){3}(.)?(\d){2}
- RegexFlightLevel: (flight)?level (\d+)
- RegexSquawkNr: squawk \d{4}
- RegexTurnDegrees: \d{2} degrees
- RegexTurnHeading: heading \d{3}
- RegexTurnPlace: to (A-Za-z0-9)+

Lists

- ListAirlines: contains callsigns of airlines from https://en.wikipedia.org/wiki/List_of_airline_codes
- ListContactIdentifiers: contact, frequency
- ListFlightLevelInstructions: climb, descend (with descent as synonym), maintain
- ListTurnDirections: left, right

Pre-Defined

- geographyV2 (to find places i.e. in 'contact rhein')