

## CHALLENGNG TASK – 4

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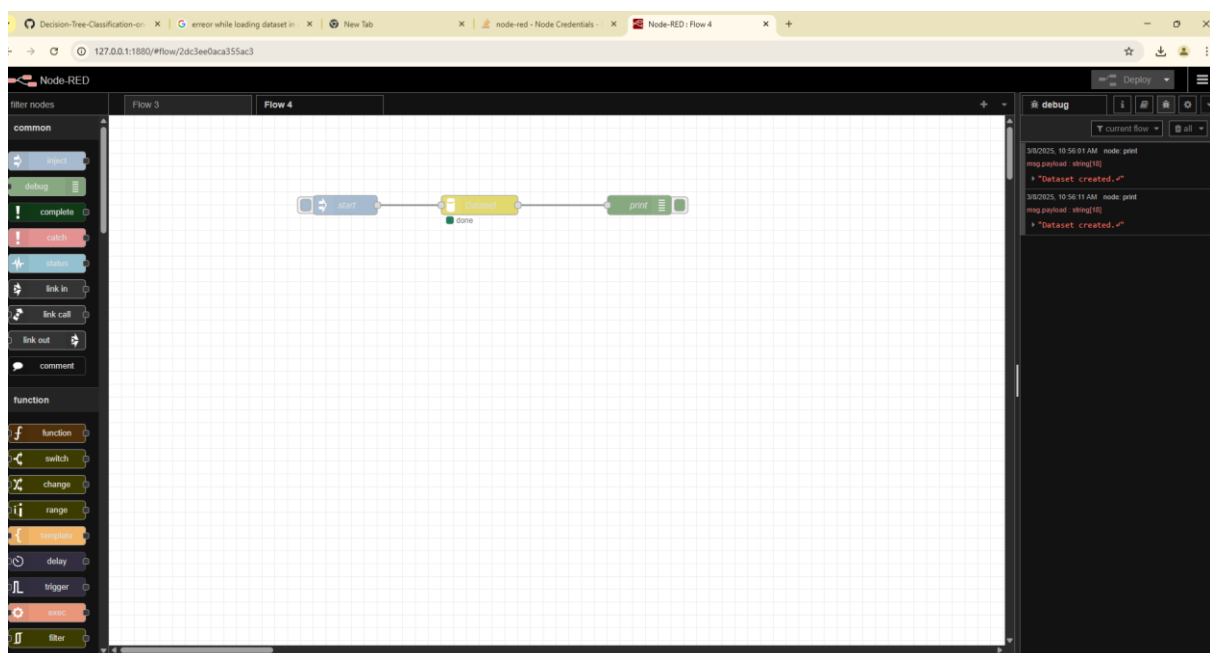
### STEP-1: CREATING DATASET

Install node-red-contrib-machine-learning nodes in NODE-RED

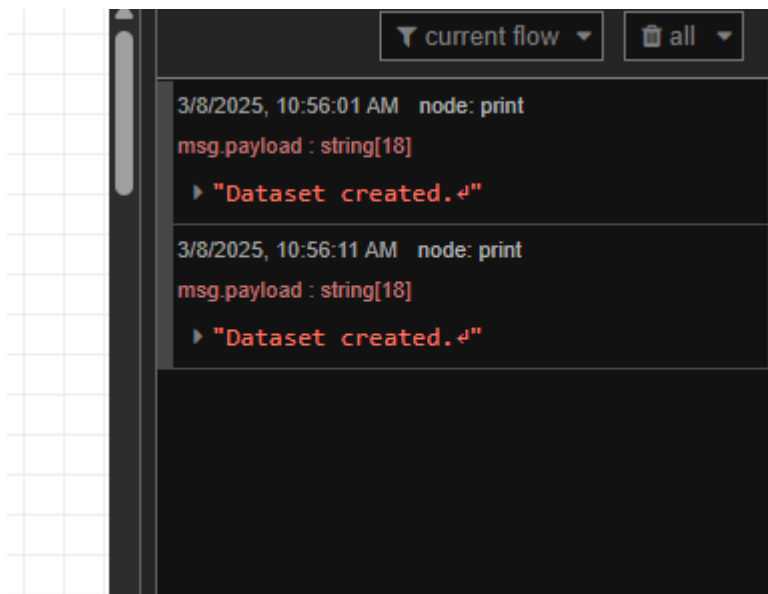
Download Dataset and save it in local machine

A1 Pregnancies										
	A	B	C	D	E	F	G	H	I	J
1	Pregnanci	Glucose	BloodPres	SkinThicki	Insulin	BMI	DiabetesF	Age	Outcome	
2	6	148	72	35	0	33.6	0.627	50	1	
3	1	85	66	29	0	26.6	0.351	31	0	
4	8	183	64	0	0	23.3	0.672	32	1	
5	1	89	66	23	94	28.1	0.167	21	0	
6	0	137	40	35	168	43.1	2.288	33	1	
7	5	116	74	0	0	25.6	0.201	30	0	
8	3	78	50	32	88	31	0.248	26	1	
9	10	115	0	0	0	35.3	0.134	29	0	
10	2	197	70	45	543	30.5	0.158	53	1	
11	8	125	96	0	0	0	0.232	54	1	
12	4	110	92	0	0	37.6	0.191	30	0	
13	10	168	74	0	0	38	0.537	34	1	
14	10	139	80	0	0	27.1	1.441	57	0	
15	1	189	60	23	846	30.1	0.398	59	1	

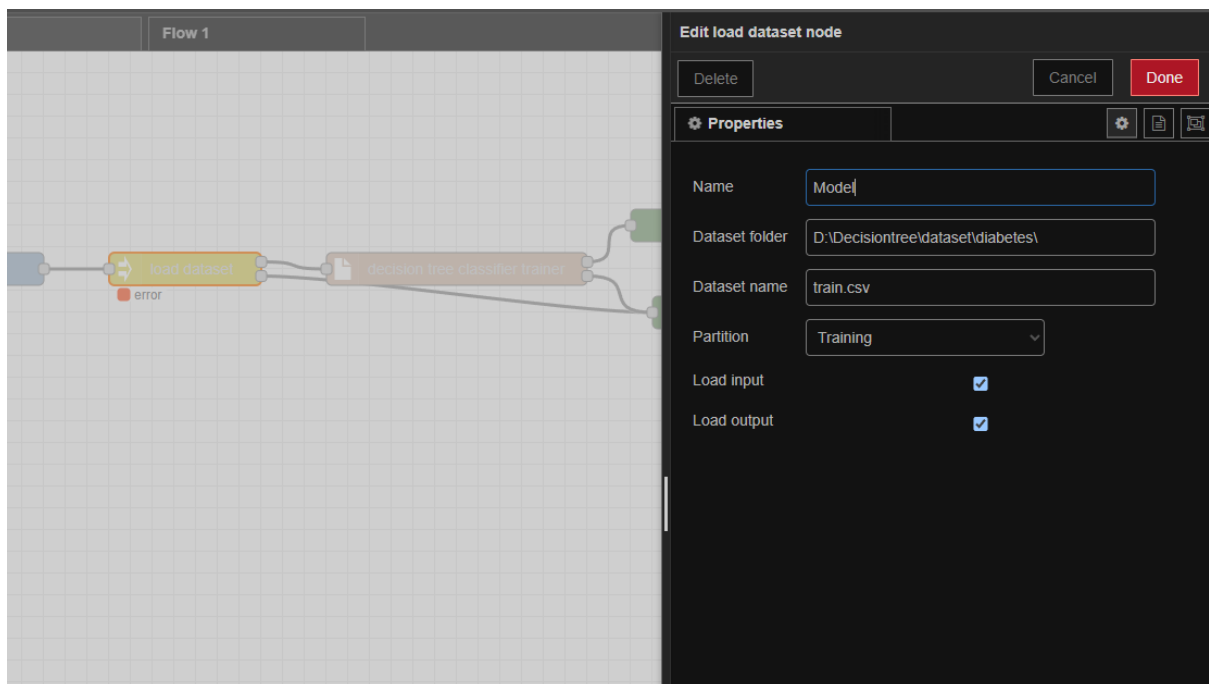
Setup the Dataset creation

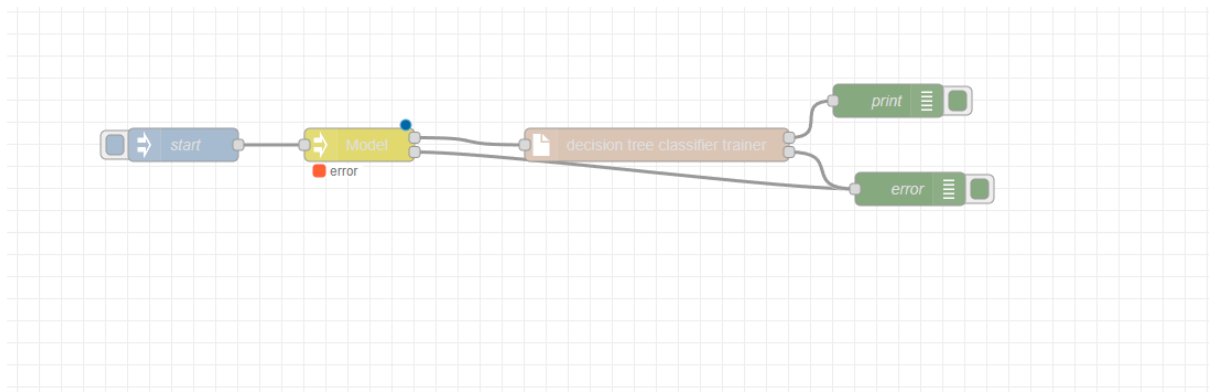


## STEP-2: TRAINING



Now train the dataset



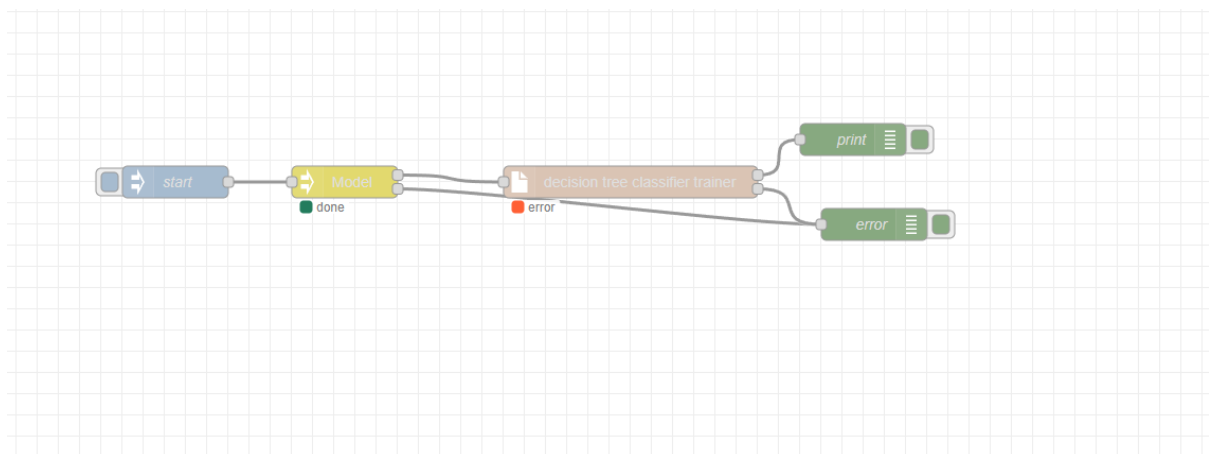


Command Prompt - pip insta X + v

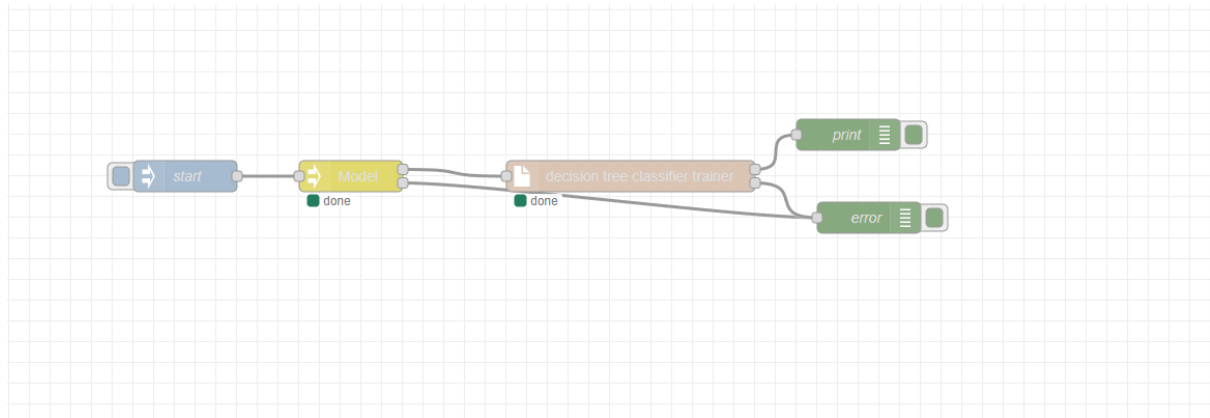
```
Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Student>pip install scikit-learn
Collecting scikit-learn
  Downloading scikit_learn-1.6.1-cp39-cp39-win_amd64.whl.metadata (15 kB)
Requirement already satisfied: numpy>=1.19.5 in c:\users\student\appdata\local\packages\pythonsoftwaref
3.9_qbz5n2kfra8p0\localcache\local-packages\python39\site-packages (from scikit-learn) (1.26.3)
Collecting scipy>=1.6.0 (from scikit-learn)
  Downloading scipy-1.13.1-cp39-cp39-win_amd64.whl.metadata (60 kB)
    60.6/60.6 kB 3.4 MB/s eta 0:00:00
Collecting joblib>=1.2.0 (from scikit-learn)
  Downloading joblib-1.4.2-py3-none-any.whl.metadata (5.4 kB)
Collecting threadpoolctl>=3.1.0 (from scikit-learn)
  Downloading threadpoolctl-3.5.0-py3-none-any.whl.metadata (13 kB)
Download scikit_learn-1.6.1-cp39-cp39-win_amd64.whl (11.2 MB)
    11.2/11.2 MB 10.9 MB/s eta 0:00:00
Download joblib-1.4.2-py3-none-any.whl (301 kB)
    301.8/301.8 kB 9.1 MB/s eta 0:00:00
Download scipy-1.13.1-cp39-cp39-win_amd64.whl (46.2 MB)
    36.7/46.2 MB 11.1 MB/s eta 0:00:01
```

Model done



```
3/8/2025, 11:18:44 AM node: print
real : msg.payload : string[97]
  ► "could not convert string to float:
  'Pregnancies'#decision-tree-
  classifier: training completed."
```



```
3/8/2025, 11:27:36 AM node: print
real : msg.payload : string[164]
▶ "Diabetes dataset loaded+Contin
target detected. Switching to
regression model.+Model Mean Squared
Error: 0.00+decision-tree-classifier:
training completed.+"
```

Trained Model

The screenshot shows a Windows File Explorer window with the address bar displaying the path: This PC > DATA (D:) > Decisiontree > models. The file list contains one item:

Name	Date modified	Type	Size
dtc.b	08-03-2025 11:27	B File	3 KB

### STEP-3: TESTING

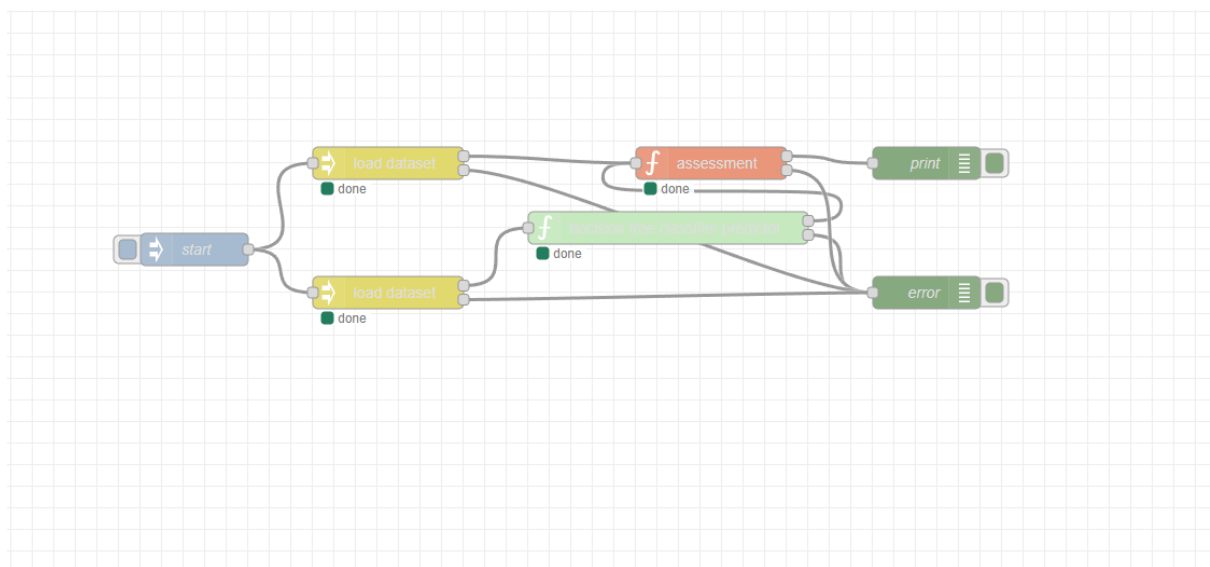
Node-RED interface showing a flow diagram and a debug console.

**Flow Diagram:**

- Start** node connects to two **load dataset** nodes.
- The top **load dataset** node connects to an **assessment** node.
- The bottom **load dataset** node connects to a **decision tree classifier predictor** node.
- The **assessment** node connects to a **print** node.
- The **decision tree classifier predictor** node connects to an **error** node.

**Debug Console:**

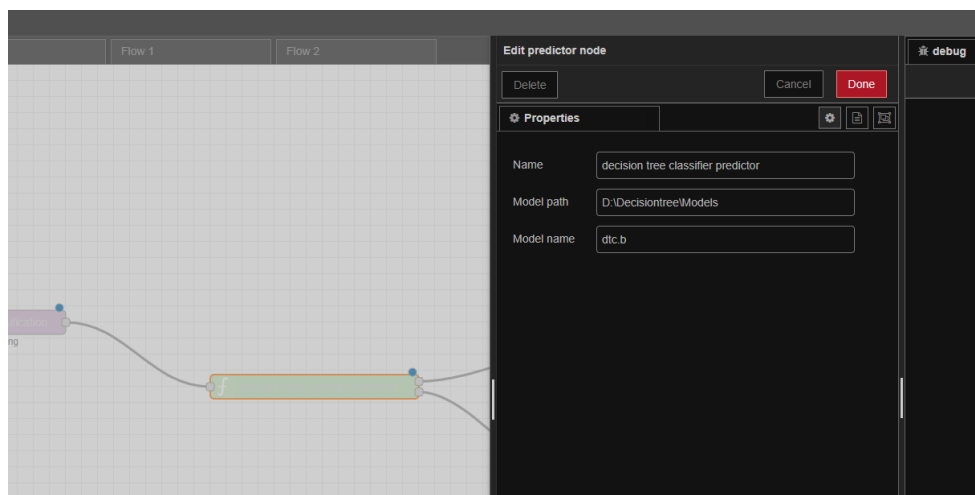
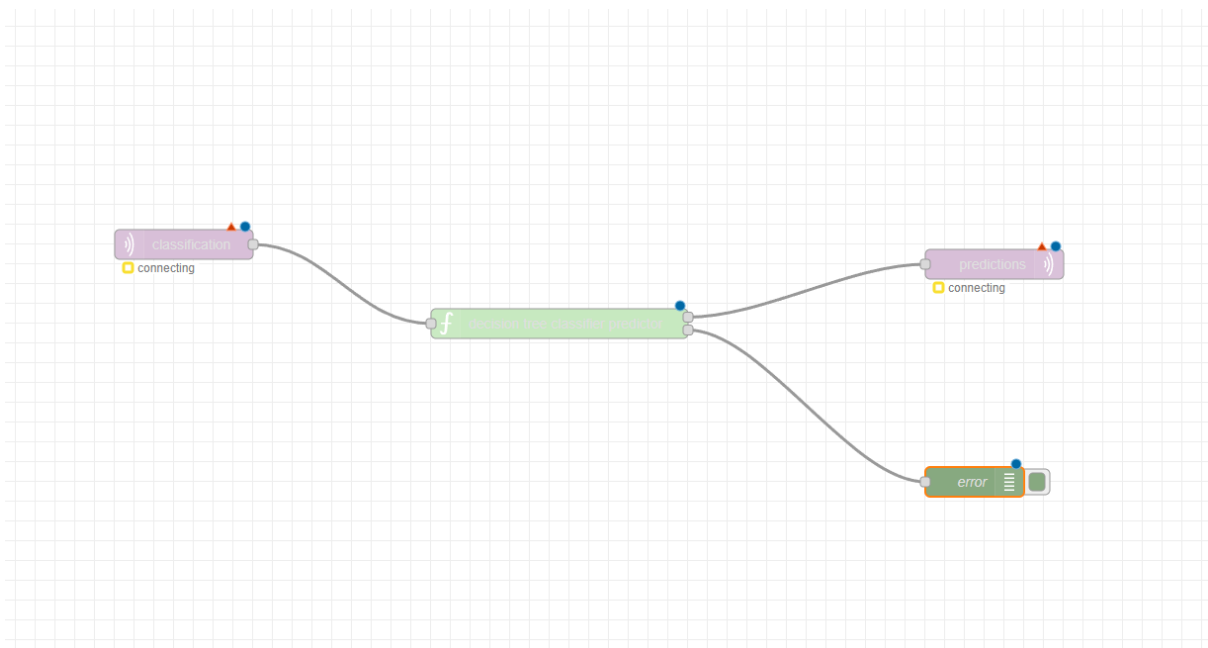
```
= pandas.read_json(input(),
orient='values')"
3/8/2025, 11:31:27 AM node error
predicted : msg.payload : string[250]
+ "C:\Users\Student\AppData\Local\Packa
get\PythonSoftwareFoundation.Python.3
.9.qd76c08604\localcache\local-
packages\Python39\site-
packages\sklearn\utils\validation.py:
2739: UserWarning: X does not have
valid feature names, but
DecisionTreeRegressor was fitted with
feature names"
3/8/2025, 11:31:27 AM node error
predicted : msg.payload : string[250]
+ "C:\Users\Student\Node-
red\node_modules\node-red-contrib-
machine-
learning\nodes\assessment\assessment.
py:136: DeprecationWarning:
inspect.getargspec() is deprecated
since Python 3.0, use
inspect.signature() or
inspect.getfullargspec()" if
"average" in
getargspec(get_score).args:-"
3/8/2025, 11:31:27 AM node error
predicted : msg.payload : string[279]
+ "C:\Users\Student\Node-
red\node_modules\node-red-contrib-
machine-
learning\nodes\assessment\assessment.
py:138: DeprecationWarning:
inspect.getargspec() is deprecated
since Python 3.0, use
inspect.signature() or
inspect.getfullargspec()" if "beta"
in getargspec(get_score).args:-"
3/8/2025, 11:31:27 AM node print
predicted : msg.payload : number
0.012987012987012988
```



```
inspect.signature() or
inspect.getfullargspec()" if 'beta'
in getargspec(get_score).args:-"

3/8/2025, 11:31:27 AM node: print
predicted : msg.payload : number
0.012987012987012988
```

## STEP-4: MQTT



## JSON CODE:

```
[
  {
    "id": "da8ca300.2dfe6",
    "type": "create dataset",
    "z": "21ce826.2ff977e",
    "name": "",
    "path": "test/iris.data",
    "saveFolder": "test/datasets",
    "saveName": "iris",
    "input": "0,1,2,3",
    "output": "4",
    "trainingPartition": "",
    "shuffle": true,
    "seed": "",
  }
]
```

```

        "x": 340,
        "y": 80,
        "wires": [
            [
                "4fb0a8dc.f6baf8"
            ]
        ]
    },
    {
        "id": "44b6f4b0.34d7dc",
        "type": "load dataset",
        "z": "21ce826.2ff977e",
        "name": "",
        "datasetFolder": "test/datasets",
        "datasetName": "iris",
        "partition": "train.csv",
        "input": true,
        "output": true,
        "x": 290,
        "y": 200,
        "wires": [
            [
                "26110acb.cbf526"
            ],
            [
                "86385870.9f6b88"
            ]
        ]
    },
    {
        "id": "4f7cc53d.87a22c",
        "type": "inject",
        "z": "21ce826.2ff977e",
        "name": "start",
        "topic": "",
        "payload": "",
        "payloadType": "date",
        "repeat": "",
        "crontab": "",
        "once": false,
        "onceDelay": 0.1,
        "x": 110,
        "y": 80,
        "wires": [
            [
                "da8ca300.2dfe6"
            ]
        ]
    },
    {
        "id": "d3e9e7ab.a06d68",
        "type": "inject",
        "z": "21ce826.2ff977e",
        "name": "start",
        "topic": "",
        "payload": "",
        "payloadType": "date",
        "repeat": "",
        "crontab": "",
        "once": false,
        "onceDelay": 0.1,

```

```

        "x": 110,
        "y": 200,
        "wires": [
            [
                "44b6f4b0.34d7dc"
            ]
        ]
    },
    {
        "id": "b21982e2.99cf1",
        "type": "inject",
        "z": "21ce826.2ff977e",
        "name": "start",
        "topic": "",
        "payload": "",
        "payloadType": "date",
        "repeat": "",
        "crontab": "",
        "once": false,
        "onceDelay": 0.1,
        "x": 110,
        "y": 440,
        "wires": [
            [
                "f1b47338.aab82",
                "1ea9f445.89d0bc"
            ]
        ]
    },
    {
        "id": "4fb0a8dc.f6baf8",
        "type": "debug",
        "z": "21ce826.2ff977e",
        "name": "print",
        "active": true,
        "tosidebar": true,
        "console": false,
        "tostatus": false,
        "complete": "payload",
        "x": 570,
        "y": 80,
        "wires": []
    },
    {
        "id": "86385870.9f6b88",
        "type": "debug",
        "z": "21ce826.2ff977e",
        "name": "error",
        "active": true,
        "tosidebar": true,
        "console": false,
        "tostatus": false,
        "complete": "payload",
        "x": 770,
        "y": 240,
        "wires": []
    },
    {
        "id": "2270c854.c34e08",
        "type": "debug",
        "z": "21ce826.2ff977e",

```



```

    "name": "print",
    "active": true,
    "tosidebar": true,
    "console": false,
    "tostatus": false,
    "complete": "payload",
    "x": 750,
    "y": 160,
    "wires": []
  },
  {
    "id": "e69a3271.c7cab",
    "type": "predictor",
    "z": "21ce826.2ff977e",
    "name": "decision tree classifier predictor",
    "modelPath": "test/models",
    "modelName": "dtc.b",
    "x": 550,
    "y": 420,
    "wires": [
      [
        "b8f2ab19.e693a8"
      ],
      [
        "f7c59de2.be773"
      ]
    ]
  },
  {
    "id": "26110acb.cbf526",
    "type": "decision tree classifier",
    "z": "21ce826.2ff977e",
    "name": "decision tree classifier trainer",
    "savePath": "test/models",
    "saveName": "dtc.b",
    "maxDepth": "",
    "criterion": "gini",
    "splitter": "best",
    "x": 540,
    "y": 200,
    "wires": [
      [
        "2270c854.c34e08"
      ],
      [
        "86385870.9f6b88"
      ]
    ]
  },
  {
    "id": "b8f2ab19.e693a8",
    "type": "assessment",
    "z": "21ce826.2ff977e",
    "name": "",
    "score": "accuracy_score",
    "x": 590,
    "y": 360,
    "wires": [
      [
        "808a0c93.8ee38"
      ]
    ]
  },

```

```

        [
            "f7c59de2.be773"
        ]
    ],
    {
        "id": "f1b47338.aab82",
        "type": "load dataset",
        "z": "21ce826.2ff977e",
        "name": "",
        "datasetFolder": "test/datasets",
        "datasetName": "iris",
        "partition": "test.csv",
        "input": false,
        "output": true,
        "x": 290,
        "y": 360,
        "wires": [
            [
                "b8f2ab19.e693a8"
            ],
            [
                "f7c59de2.be773"
            ]
        ]
    },
    {
        "id": "1ea9f445.89d0bc",
        "type": "load dataset",
        "z": "21ce826.2ff977e",
        "name": "",
        "datasetFolder": "test/datasets",
        "datasetName": "iris",
        "partition": "test.csv",
        "input": true,
        "output": false,
        "x": 290,
        "y": 480,
        "wires": [
            [
                "e69a3271.c7cab"
            ],
            [
                "f7c59de2.be773"
            ]
        ]
    },
    {
        "id": "f7c59de2.be773",
        "type": "debug",
        "z": "21ce826.2ff977e",
        "name": "error",
        "active": true,
        "tosidebar": true,
        "console": false,
        "tostatus": false,
        "complete": "payload",
        "x": 790,
        "y": 480,
        "wires": []
    },

```

```

{
  "id": "808a0c93.8ee38",
  "type": "debug",
  "z": "21ce826.2ff977e",
  "name": "print",
  "active": true,
  "tosidebar": true,
  "console": false,
  "tostatus": false,
  "complete": "payload",
  "x": 790,
  "y": 360,
  "wires": []
},
{
  "id": "8a4ea95c.f860b8",
  "type": "predictor",
  "z": "21ce826.2ff977e",
  "name": "decision tree classifier predictor",
  "modelPath": "test/models",
  "modelName": "dtc.b",
  "x": 450,
  "y": 580,
  "wires": [
    [
      "e967043f.480868"
    ],
    [
      "e66df10b.40ba8"
    ]
  ]
},
{
  "id": "e967043f.480868",
  "type": "mqtt out",
  "z": "21ce826.2ff977e",
  "name": "",
  "topic": "predictions",
  "qos": "",
  "retain": "",
  "broker": "cb216faf.d9136",
  "x": 730,
  "y": 540,
  "wires": []
},
{
  "id": "e66df10b.40ba8",
  "type": "debug",
  "z": "21ce826.2ff977e",
  "name": "error",
  "active": true,
  "tosidebar": true,
  "console": false,
  "tostatus": false,
  "complete": "payload",
  "x": 710,
  "y": 620,
  "wires": []
},
{
  "id": "3cd1a442.2bc73c",

```

```

    "type": "mqtt in",
    "z": "21ce826.2ff977e",
    "name": "",
    "topic": "classification",
    "qos": "2",
    "broker": "cb216faf.d9136",
    "x": 140,
    "y": 580,
    "wires": [
      [
        "8a4ea95c.f860b8"
      ]
    ]
  },
  {
    "id": "cb216faf.d9136",
    "type": "mqtt-broker",
    "z": "",
    "name": "",
    "broker": "iot.eclipse.org",
    "port": "1883",
    "clientid": "",
    "usetls": false,
    "compatmode": true,
    "keepalive": "60",
    "cleansession": true,
    "willTopic": "",
    "willQos": "0",
    "willPayload": "",
    "birthTopic": "",
    "birthQos": "0",
    "birthPayload": ""
  }
]

```