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8. **Introduzione**

Questo documento ha il compito di illustrare l’utilizzo della prima versione dell’applicazione **VINMIC**.

L’applicazione software è stata sviluppata dal gruppo formato da:

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Il nome dell’applicazione corrisponde alle iniziali dei nomi dei membri del nostro gruppo.

**VINMIC** nasce con lo scopo di simulare l’operato di un giudice, andando a stabilire determinate pene e la loro gravità per ciascun imputato già ritenuto colpevole, e infine assegnare un determinato luogo in cui scontare tale pena per un determinato periodo di tempo.

Si è scelto di creare totalmente un nuovo dataset, invece di scaricarne uno da internet, poiché nessuno di quelli da noi ritrovati era in grado di soddisfare le nostre esigenze, affinché la nostra applicazione avesse una base di conoscenza ideale.

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1. **Requisiti Funzionali**

Per poter avviare in modo corretto il programma è necessario installare:

* **'numpy'**, tramite il comando da terminale **pip install numpy** per la predizione;
* **'pandas'**, tramite il comando da terminale **pip install pandas** per il classificatore;
* '**sklearn.tree'**, tramite il comando da terminale **pip install scikit-learn** per il classificatore;

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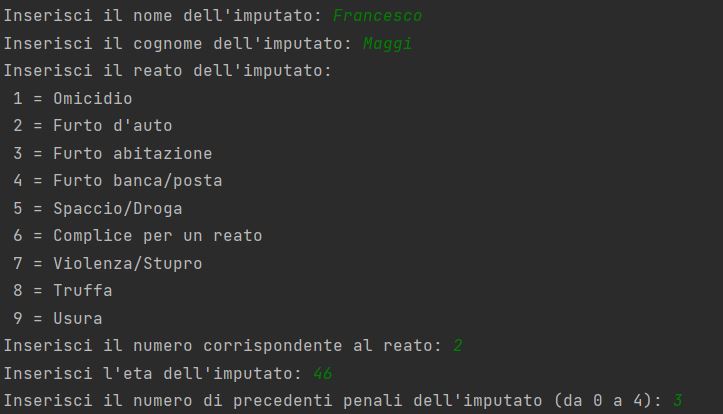
1. **Manuale Utente**

Quando l’applicazione verrà avviata, si visualizzerà la schermata iniziale a linea di comando:

![Immagine che contiene testo, caso, accessorio, screenshot

Descrizione generata automaticamente](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAeAB4AAD/4RD0RXhpZgAATU0AKgAAAAgABAE7AAIAAAAOAAAISodpAAQAAAABAAAIWJydAAEAAAAcAAAQ0OocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAE1pa2kgUml2aWVsbG8AAAWQAwACAAAAFAAAEKaQBAACAAAAFAAAELqSkQACAAAAAzY5AACSkgACAAAAAzY5AADqHAAHAAAIDAAACJoAAAAAHOoAAAAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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pkCqvny+Xs8x9mMbdxxQk0sYIjkdAeoViKAJbXT729umtrO0nnnUEtFFGWYY68DmifT721vBaXNpPDcsQBDJGVc56cHnmoVkdG3I7K3qDg0NI7PvZ2Zv7xPNAFq90jUtNRG1GwurVXOFM8LIGPtkU46Jqq2P21tNuxabd/nmBtm313YxiqjzSS48yRnx03MTR58vl7PMfZjG3ccUAWrLRtT1KNpNP0+6ukU7WaGFnAPpkCorXT729umtrO0nnnUEtFFGWYY68DmokmljBEcjoD1CsRSLI6NuR2VvUHBoAmn0+9tbwWlzaTw3LEAQyRlXOenB55qS90jUtNRG1GwurVXOFM8LIGPtkVVaR2fezszf3ieaV5pJceZIz46bmJoAtnRNVWx+2tpt2LTbv88wNs2+u7GMUllo2p6lG0mn6fdXSKdrNDCzgH0yBVXz5fL2eY+zGNu44oSaWMERyOgPUKxFAEtrp97e3TW1naTzzqCWiijLMMdeBzRPp97a3gtLm0nhuWIAhkjKuc9ODzzUKyOjbkdlb1BwaGkdn3s7M394nmgC1e6RqWmojajYXVqrnCmeFkDH2yKcdE1VbH7a2m3YtNu/zzA2zb67sYxVR5pJceZIz46bmJo8+Xy9nmPsxjbuOKALVlo2p6lG0mn6fdXSKdrNDCzgH0yBUVrp97e3TW1naTzzqCWiijLMMdeBzUSTSxgiOR0B6hWIpFkdG3I7K3qDg0ATT6fe2t4LS5tJ4bliAIZIyrnPTg881Je6RqWmojajYXVqrnCmeFkDH2yKqtI7PvZ2Zv7xPNK80kuPMkZ8dNzE0AWzomqrY/bW027Fpt3+eYG2bfXdjGKSy0bU9SjaTT9PurpFO1mhhZwD6ZAqr58vl7PMfZjG3ccUJNLGCI5HQHqFYigCW10+9vbpraztJ551BLRRRlmGOvA5on0+9tbwWlzaTw3LEAQyRlXOenB55qFZHRtyOyt6g4NDSOz72dmb+8TzQBavdI1LTURtRsLq1VzhTPCyBj7ZFOOiaqtj9tbTbsWm3f55gbZt9d2MYqo80kuPMkZ8dNzE0efL5ezzH2Yxt3HFAFqy0bU9SjaTT9PurpFO1mhhZwD6ZAqK10+9vbpraztJ551BLRRRlmGOvA5qJJpYwRHI6A9QrEUiyOjbkdlb1BwaAJp9PvbW8Fpc2k8NyxAEMkZVznpweeakvdI1LTURtRsLq1VzhTPCyBj7ZFVWkdn3s7M394nmleaSXHmSM+Om5iaALZ0TVVsftrabdi027/PMDbNvruxjFJZaNqepRtJp+n3V0inazQws4B9MgVV8+Xy9nmPsxjbuOKEmljBEcjoD1CsRQBLa6fe3t01tZ2k886gloooyzDHXgc0T6fe2t4LS5tJ4bliAIZIyrnPTg881Csjo25HZW9QcGhpHZ97OzN/eJ5oAtXukalpqI2o2F1aq5wpnhZAx9sinHRNVWx+2tpt2LTbv88wNs2+u7GMVUeaSXHmSM+Om5iaPPl8vZ5j7MY27jigC1ZaNqepRtJp+n3V0inazQws4B9MgVFa6fe3t01tZ2k886gloooyzDHXgc1Ek0sYIjkdAeoViKRZHRtyOyt6g4NAEl3ZXVhcGC+t5baYAExzIVYA+xqGld2kbc7Fj6k5pKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAoq1qWm3ej6jLY6jF5NzFjem4NjIBHIJHQiqtABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFdG9hoI8JLqaw6j9oaY2wU3EewOEDbsbM7cnpnPvXOV1cmnY8ApB9v04zLdtdGIXsZfYYgOmc7sjp1ofwv8ArqC3Rk2PhnVtStYriztQ8UrMqMZUXcw6jkjnnp37VXs9Gv769ltLa2YzQgmVXYIIwDg7ixAHPrWnNdRf8IzoMSzp5kN1O0iBxlASmCR26GtFrzf4111rK701obl5BsvH/c3K7wcbgQB0yDkdOtPr94dP68znLrRtQs7+Kyntm8+YAxKhD+Zk4G0qSDz6U/UtB1LSY0kv7by43YoHWRXAYfwkqTg+x5roBcaRpHjLRrqJoI0RQ12ltMZoYnJYfK2ScYIJwTiotenhtdAks7ePSIlnuFkKWN1JOzbQcMSWIUc9ODzU9A6mW/hTWktDctZHyxEJuJELFCM7goOSMHsOO9O0TQjqFrdXlxFJJbQwSMPs88SuGUZyUZslfXA+lWNe1V4NctbrTLpS8dhDHvjIYD90FZe47kEVN4SsQBd3U19YQJNZTwIs95HG25lIGVJyBnvT728wXS/kYWnaXearcNDYQ+Y6KXYlgqqo7liQAPqafdaNqFlfxWc9s3nzAGJUIfzATgbSpIPPpWnoiT6dql5aC70pi8Ox47mYNBcDIO3eDgEcHOR0rQ+0aRpHjHR7mFoIkRQbtbaYzRQuSw+VsnIwQSATijsLozn9R0DUtJhWW+ttkbNs3rIrgN/dJUnB9jzVm40I2fhcahcxSebJOqxyRzxPFtKk4YKxYNx3o1DTv7N0uRW1q3nMs4ItbSbzFcAH94xBwMZwARnk9K1IdIP/AAhctkdS0oTyXkc6odQi+4EYH+Lrkjil0fy/Qrqjkav6PpcuragkEShlBBkHnRxsVyAdpcgE88CqFaeg2TXepxOLi1gWCRHY3NwkWRu7biM/hVx3JloguINOsfEN1b3kF6bWGR4xGJUWUEHHLYZfril8Sadb6VrklrZGUwCON185gW+ZFbkgAd/SrHi218rxBeXSXVpcRXVxLJGba4SX5S2RnaTjr3qx4ot0vpv7XtLyzkgaCAeWLhfNBEaqQY87uCD2rNfCmyn8TRzdatj4Z1bUrWK4s7UPFKzKjGVF3MOo5I556d+1ZVdBNdRf8IzoMSzp5kN1O0iBxlASmCR26GrSu7EvQzLTR7++vpLS2tmaeEEyqxCeXg4O4nAHPrUjeH9UXVU01rQ/anQuib1w64JyGzgjAPQ10Vxc2l7rXiqzjvbaM375t5nkAifbKGI39Bkd+lOgvLO11vRbZ723k+w6fNFNOkgMYdlkIUN0P3gPqalP3U/66lW1aOevvDmq6batc3lpshVlUuJFYfMMqeCeD69KG8N6smm/bms2EHl+b99dwT+9szu2++MVtXt7av4bu4luYWkaxsVVBICSyk7hj1Hf0rUvdVsmabVbNdIHmWXl+bJcyeeSYghTyg2M9vu475pvS/kJatHntW9O0q81adobCHzXRC7ksFVVHcsSAB9TVSt/w60M2maxpz3UNtNdwx+S87hEJVwxUseBkevpQBHq/h+TT/7Kgijme7vIdzxZDfP5jKAuOxAHr1qtf6Df6QI5dTtikLPtLRyI/I6rlSQGx2NdIL+y0vXfCzTXsFxHZ2+yeSF96ofMf054yPw5FVdenhtdAks7ePSIlnuFkKWN1JOzbQcMSWIUc9ODzRtr5v8AMF28v0M7WdP0yLRdP1HSlu0W6klR0uZVfGzbjBVV/vU61sNKvfDV/cxJeJfWUSOzNKhictIF4XbkcH1qeOBNX8I2Ftb3lnFPZzztJHc3CxEhthBG4jPQ9Kh8OtFLp+sae9xBbzXdugiaeQRoSsisRuPA4B60eQLo/wCtzN0e0iv9bsrO4ZliuLhInKHBAZgDjP1pJrLOsSWVqQ379oozI4XPOBknAH14qK7tms7p4HkhkZOrQyCRDxnhhwaS1t2u7pIEeKNnOA0sgRR9WPAo3sGxo69pK6Q1lF5UyTS24kl8yWORWYkjKFCRt4781LJ4O16IMXsD8oYnEqH7oyRw3XHOOpHIq/4msB/ZumSx3+nzfY7JIZUhvY3bdvY8KDk/eHStx9UsD4haT7dbeX/aUz7vOXG02+Ac56Z4z60PZ/P8w7f10OOsfDWralaxXFnah4pWZUcyou5h1HJHPPTv2qoNMvDHeP5DAWWPtG4gGPLbeQeevHFdNBYfbvCOhD7da2nl3U7E3MojGMpkgnqR6deaGv7PVdW8TwRXUMA1I7raWdtiMVlDYJPTIB60PcFt/Xc56PRb6WS0RYkU3kZkgLzIgZQSCckgDlT1xV/xJ4VuNBuJDujktl2AP58ZckqCfkDZ655xTfEksAi0uxguIrhrK08uWSFtyby7NgHvgMORU/i2GO7vm1a1vLSa3nSIKiXCmUERgHKZ3DBB7UegL9CgfDWrrp3242beQI/NPzruCf3tmd2PfGKu6T4RutU0O6v42iBjVTApuYl35fad2WBX8cZrpLdtFs5p5baTTTC9hIkV3JfO1w5MJG1kLYU54wQPQVzPh7yrjSNZ09rm3t57qKLyjcSiNW2yAkbjwDijrYFsmZ9vomoXWoy2NvAJJ4QTJtkUogHUl87ce+cVFqGm3el3X2e/hMUm0MBkEMp6EEcEe4rY0ZIktda0ia8tYZ7iNFilaYeUxSQMRv6cjoenFReJJYVg0qxiuIrmSytfLlkhbcm4uzYDd8AjkcUdEHf+uxm6hpV7pTwrfwGEzxLNGCwO5D0PBqpVzUbD7A8Ci8trvzYVkzbybwmf4W44YelU6AOp+JX/ACULU/8Atl/6KSuWrqfiV/yULU/+2X/opK5agAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigCeS+uJrGCzkkzBbszRptHylsbuep6CoKKKACiiigAooooAKKKKACiiigDU8S61/wkPiG51T7P8AZ/P2fut+/btQL1wM9M9Ky6KKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooA/9k=)

Qui è possibile osservare un esempio di interazione con il sistema, dove una volta inseriti i dati relativi all’imputato:



Qui di seguito si trova la predizione della tipologia di pena e la sua relativa accuratezza media:

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Qui di seguito si trova la predizione sul numero di anni di carcere o sui mesi di condanna agli arresti domiciliari e la sua relativa accuratezza media:

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Qui di seguito si trova la predizione sul luogo in cui si dovrà scontare la pena:

****

Una volta individuato il luogo in cui si dovrà scontare la pena, verrà visualizzato a linea di comando il seguente messaggio, e l’applicazione verrà chiusa in seguito:

![Immagine che contiene testo

Descrizione generata automaticamente](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAeAB4AAD/4RD0RXhpZgAATU0AKgAAAAgABAE7AAIAAAAOAAAISodpAAQAAAABAAAIWJydAAEAAAAcAAAQ0OocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAE1pa2kgUml2aWVsbG8AAAWQAwACAAAAFAAAEKaQBAACAAAAFAAAELqSkQACAAAAAzY0AACSkgACAAAAAzY0AADqHAAHAAAIDAAACJoAAAAAHOoAAAAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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KCkqNDU2Nzg5OkNERUZHSElKU1RVVldYWVpjZGVmZ2hpanN0dXZ3eHl6g4SFhoeIiYqSk5SVlpeYmZqio6Slpqeoqaqys7S1tre4ubrCw8TFxsfIycrS09TV1tfY2drh4uPk5ebn6Onq8fLz9PX29/j5+v/EAB8BAAMBAQEBAQEBAQEAAAAAAAABAgMEBQYHCAkKC//EALURAAIBAgQEAwQHBQQEAAECdwABAgMRBAUhMQYSQVEHYXETIjKBCBRCkaGxwQkjM1LwFWJy0QoWJDThJfEXGBkaJicoKSo1Njc4OTpDREVGR0hJSlNUVVZXWFlaY2RlZmdoaWpzdHV2d3h5eoKDhIWGh4iJipKTlJWWl5iZmqKjpKWmp6ipqrKztLW2t7i5usLDxMXGx8jJytLT1NXW19jZ2uLj5OXm5+jp6vLz9PX29/j5+v/aAAwDAQACEQMRAD8A8eoop0UhimSRQpKMGAZQwOPUHqKAG0Vf1HV5tSRFmgs4ghyDb2scRP1KgZpx1udtN+xfZrER7Am8WcYkx678bs++aAM6itDT9Zn02Fo4beylDNuJuLSOUj6FgcCobPUJLK8a5jit5HYEFZoEkQZ9FYECgCrRVq51CS6v1u3it0dSDsigREOP9gDH6c1LqOrzakiLNBZxBDkG3tY4ifqVAzQBQorROtztpv2L7NYiPYE3izjEmPXfjdn3zSafrM+mwtHDb2UoZtxNxaRykfQsDgUAZ9FWrPUJLK8a5jit5HYEFZoEkQZ9FYECi51CS6v1u3it0dSDsigREOP9gDH6c0AVaKv6jq82pIizQWcQQ5Bt7WOIn6lQM0463O2m/Yvs1iI9gTeLOMSY9d+N2ffNAGdRWhp+sz6bC0cNvZShm3E3FpHKR9CwOBUNnqElleNcxxW8jsCCs0CSIM+isCBQBVoq1c6hJdX63bxW6OpB2RQIiHH+wBj9Oal1HV5tSRFmgs4ghyDb2scRP1KgZoAoUVonW52037F9msRHsCbxZxiTHrvxuz75pNP1mfTYWjht7KUM24m4tI5SPoWBwKAM+irVnqElleNcxxW8jsCCs0CSIM+isCBRc6hJdX63bxW6OpB2RQIiHH+wBj9OaAKtFX9R1ebUkRZoLOIIcg29rHET9SoGacdbnbTfsX2axEewJvFnGJMeu/G7PvmgDOorQ0/WZ9NhaOG3spQzbibi0jlI+hYHAqGz1CSyvGuY4reR2BBWaBJEGfRWBAoAq0VaudQkur9bt4rdHUg7IoERDj/YAx+nNS6jq82pIizQWcQQ5Bt7WOIn6lQM0AUKK0Trc7ab9i+zWIj2BN4s4xJj1343Z980mn6zPpsLRw29lKGbcTcWkcpH0LA4FAGfRVqz1CSyvGuY4reR2BBWaBJEGfRWBAoudQkur9bt4rdHUg7IoERDj/YAx+nNAFWir+o6vNqSIs0FnEEOQbe1jiJ+pUDNOOtztpv2L7NYiPYE3izjEmPXfjdn3zQBnUVoafrM+mwtHDb2UoZtxNxaRykfQsDgVDZ6hJZXjXMcVvI7AgrNAkiDPorAgUAVaKtXOoSXV+t28VujqQdkUCIhx/sAY/TmpdR1ebUkRZoLOIIcg29rHET9SoGaAKFFaJ1udtN+xfZrER7Am8WcYkx678bs++aTT9Zn02Fo4beylDNuJuLSOUj6FgcCgDPoq1Z6hJZXjXMcVvI7AgrNAkiDPorAgUXOoSXV+t28VujqQdkUCIhx/sAY/TmgCrRV/UdXm1JEWaCziCHINvaxxE/UqBmnHW52037F9msRHsCbxZxiTHrvxuz75oAzqK0NP1mfTYWjht7KUM24m4tI5SPoWBwKhs9QksrxrmOK3kdgQVmgSRBn0VgQKAKtFWrnUJLq/W7eK3R1IOyKBEQ4/wBgDH6c1LqOrzakiLNBZxBDkG3tY4ifqVAzQBQorROtztpv2L7NYiPYE3izjEmPXfjdn3zSafrM+mwtHDb2UoZtxNxaRykfQsDgUAZ9FWrPUJLK8a5jit5HYEFZoEkQZ9FYECi51CS6v1u3it0dSDsigREOP9gDH6c0AVaKv6jq82pIizQWcQQ5Bt7WOIn6lQM0463O2m/Yvs1iI9gTeLOMSY9d+N2ffNAGdRWhp+sz6bC0cNvZShm3E3FpHKR9CwOBUNnqElleNcxxW8jsCCs0CSIM+isCBQBVoq1c6hJdX63bxW6OpB2RQIiHH+wBj9Oal1HV5tSRFmgs4ghyDb2scRP1KgZoAoUVonW52037F9msRHsCbxZxiTHrvxuz75pNP1mfTYWjht7KUM24m4tI5SPoWBwKAM+irVnqElleNcxxW8jsCCs0CSIM+isCBRc6hJdX63bxW6OpB2RQIiHH+wBj9OaAKtFX9R1ebUkRZoLOIIcg29rHET9SoGacdbnbTfsX2axEewJvFnGJMeu/G7PvmgDOorQ0/WZ9NhaOG3spQzbibi0jlI+hYHAqGz1CSyvGuY4reR2BBWaBJEGfRWBAoAq0VaudQkur9bt4rdHUg7IoERDj/YAx+nNS6jq82pIizQWcQQ5Bt7WOIn6lQM0AUKK0Trc7ab9i+zWIj2BN4s4xJj1343Z980mn6zPpsLRw29lKGbcTcWkcpH0LA4FAGfRVqz1CSyvGuY4reR2BBWaBJEGfRWBAoudQkur9bt4rdHUg7IoERDj/AGAMfpzQBVoq/qOrzakiLNBZxBDkG3tY4ifqVAzTjrc7ab9i+zWIj2BN4s4xJj1343Z980AZ1FaGn6zPpsLRw29lKGbcTcWkcpH0LA4FQ2eoSWV41zHFbyOwIKzQJIgz6KwIFAFWirVzqEl1frdvFbo6kHZFAiIcf7AGP05qXUdXm1JEWaCziCHINvaxxE/UqBmgChRWidbnbTfsX2axEewJvFnGJMeu/G7Pvmk0/WZ9NhaOG3spQzbibi0jlI+hYHAoAz6KtWeoSWV41zHFbyOwIKzQJIgz6KwIFFzqEl1frdvFbo6kHZFAiIcf7AGP05oAq0Vf1HV5tSRFmgs4ghyDb2scRP1KgZpx1udtN+xfZrER7Am8WcYkx678bs++aAM6itDT9Zn02Fo4beylDNuJuLSOUj6FgcCobPUJLK8a5jit5HYEFZoEkQZ9FYECgCrRVq51CS6v1u3it0dSDsigREOP9gDH6c1LqOrzakiLNBZxBDkG3tY4ifqVAzQBQorROtztpv2L7NYiPYE3izjEmPXfjdn3zSafrM+mwtHDb2UoZtxNxaRykfQsDgUAZ9FWrPUJLK8a5jit5HYEFZoEkQZ9FYECi51CS6v1u3it0dSDsigREOP9gDH6c0AVaKv6jq82pIizQWcQQ5Bt7WOIn6lQM0463O2m/Yvs1iI9gTeLOMSY9d+N2ffNAGdRWhp+sz6bC0cNvZShm3E3FpHKR9CwOBUNnqElleNcxxW8jsCCs0CSIM+isCBQBVoq1c6hJdX63bxW6OpB2RQIiHH+wBj9Oal1HV5tSRFmgs4ghyDb2scRP1KgZoAoUVonW52037F9msRHsCbxZxiTHrvxuz75pNP1mfTYWjht7KUM24m4tI5SPoWBwKAM+irVnqElleNcxxW8jsCCs0CSIM+isCBRc6hJdX63bxW6OpB2RQIiHH+wBj9OaAKtFX9R1ebUkRZoLOIIcg29rHET9SoGacdbnbTfsX2axEewJvFnGJMeu/G7PvmgDOooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAoorW8R2VvYX1tHaR+Wr2cErDcTlmQEnn3NAGTRWno8VhLDqZ1DZuSzZrbc+397uXGOeTgnineGhaS69a21/Yx3kVzKkOHkdNm5gNw2kc/Wmld2FeyuZVFdRa22mX3jxLL+zI4bON5Y2gSWQ+ZsDHJJYkHgdD2qzq/hux0zw1fTCPfci5V7eXeeLdmITjODnaxyam+lyrWdjjqK7p9J0efxCdDTRxCv2VZDexzyFoz5IfcwLFcZ9hXPzafbJ4f0W5WPE11PMkzbj8wVlA47dT0qkruxN9L/ANdzForq1ttLtPHtxpMulRXNtJfiCMPNKpiXfjgqwz1756Vla0bWbV2s9N02Kz8qZogI5JHMnzYGdzH9PWktbW6jel79DJorqPGWjafpbWkmlR7YgXtp/nLbpoyAx5PGcjgU95tF/wCEVXUh4dtRK121vt+0z4ACBs/f65NHS4dbHKUV0llbaXY6Hp93qGnm+kv7iROZmjESIVHG3qTu75HHSsnXLBdL169sY2LpbztGrN1IB4zRsBRorV8MWcGoeKNPtLyPzIJp1R0yRuHpkc1b162e1tP3nhVtJBkwtw3n89ePnYigFqc/RWm8Vh/wisUq7P7QN4yt8/ze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1. **Scelte Progettuali**

Nella nostra applicazione software sono stati utilizzati:

* Una **base di conoscenza**, interamente realizzata da noi, e contenente più di 1200 condannati, in cui per ogni condannato venivano collezionate le informazioni relative a ciascun imputato;
* Una **rete neurale**, in grado di predire la tipologia di pena da assegnare ad un imputato, sulla base delle informazioni fornitele;
* Un **albero di decisione**, in grado di attribuire a ciascun imputato la giusta tipologia di luogo in cui scontare la pena;
* Un **regressore**, utilizzando il random forest, in grado di stabilire la durata della pena assegnata all’imputato;
* La **K-Fold-Cross-Validation**, in grado calcolare l’accuratezza delle predizioni.

**Base di Conoscenza**

Abbiamo dotato la nostra applicazione software di una base di conoscenza interamente realizzata da noi, attraverso Microsoft Excel, salvato in formato .csv, e collezionando per ciascun imputato le seguenti informazioni in apposite colonne:

- reato, che indica la tipologia di reato commesso dall’imputato;

- nome, cognome;

- età, utile soprattutto per stabilire a quale tipologia di luogo dovesse essere assegnato l’imputato;

- precedenti\_penali, che indica il numero di precedenti penali dell’imputato, utile per stabilire la gravità della pena;

- pena, che indica la tipologia di pena assegnata all’imputato;

- tipo\_carcere, che indica la tipologia di luogo in cui l’imputato dovrà scontare la pena;

- durata, che indica il numero di mesi di condanna da scontare.

**Rete Neurale**

L’applicazione utilizza la rete neurale, sfruttando un classificatore KNN per determinare la tipologia di pena da attribuire ad un imputato inserito in input.

Per fare ciò, è stato addestrato il classificatore attraverso il dataset in formato ‘.csv’ .

Le informazioni utili alla predizione sono:

* Reato, ovvero il reato commesso dall’imputato;
* Precedenti penali, ovvero il numero di precedenti penali dell’imputato;
* Età dell’imputato.

Ad ogni campo i valori assegnati sono interi.

Per il reato sono stati associati i seguenti valori:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Omicidio** | **Furto d’auto** | **Furto in abitazione** | **Furto in banca/posta** | **Spaccio/**  **Droga** | **Complice in un reato** | **Violenza**  **/Stupro** | **Truffa** | **Usura** |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Per i precedenti penali è stato prefissato un range che va da 0 a 4.

La predizione è stata fatta all’interno del metodo di una classe, il quale restituisce un intero corrispondente alla tipologia di pena. Alle tipologie di pena sono stati assegnati i seguenti valori:

|  |  |  |
| --- | --- | --- |
| **Ergastolo** | **Carcere** | **Arresti domiciliari** |
| 1 | 2 | 3 |

La predizione segue una determinata logica di combinazioni tra tre campi, corrispondente alle seguenti condizioni:

|  |  |  |  |
| --- | --- | --- | --- |
| **REATO** | **ETÀ** | **PRECEDENTI PENALI** | **PENA** |
| 1 | <=50 | Qualsiasi | Carcere |
| 1 | >50 | >1 | Ergastolo |
| 1 | >50 | <=1 | Carcere |
| 2/3/5/6 | Qualsiasi | <=1 | Arresti domiciliari |
| 2/3/5/6 | Qualsiasi | >1 | Carcere |
| 4/7 | >60 | >1 | Ergastolo |
| 4/7 | <=60 | QuQualsiasi | Carcere |
| 4/7 | >60 | <=1 | Carcere |
| 8/9 | Qualsiasi | Qualsiasi | Carcere |

**Albero di decisione**

L’applicazione utilizza il DecisionTreeClassifier per determinare il luogo in cui gli inputati sconteranno la loro pena. I dati che vengono utilizzati sono:

* Reato, ovvero il reato commesso dall’imputato;
* Precedenti penali, ovvero il numero di precedenti penali dell’imputato;
* Pena.

Il risultato della predizione è un valore numerico attribuito ad un luogo con i seguenti valori:

|  |  |  |  |
| --- | --- | --- | --- |
| **Abitazione o luoghi appositi per i domiciliari** | **Istituto penitenziario minorile** | **Istituto penitenziario** | **Istituto penitenziario di massima sicurezza** |
| 0 | 1 | 2 | 3 |

**Regressore**

L’applicazione utilizza il RandomForestRegression per determinare la durata della reclusione in carcere o degli arrresti domiciliari.

La durata calcolata è distinta in mesi per quanto concerne gli arresti domiciliari, mentre per la reclusione in carcere è espressa in anni.

Per calcolare la durata abbiamo attribuito una valenza iniziale a ciascun reato e sommato a quel valore il numero di precedenti penali dell’imputato.

La predizione segue una determinata logica di combinazioni tra tre campi, corrispondente alle seguenti condizioni:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **REATO** | **VALENZA** | **PRECEDENTI PENALI** | **PENA** | **DURATA** |
| 1 | 12 | 0 | Carcere | 12 anni |
| 1 | 12 | 1 | Carcere | 13 anni |
| 1 | 12 | 2 | Carcere | 14 anni |
| 1 | 12 | 3 | Carcere | 15 anni |
| 1 | 12 | 4 | Carcere | 16 anni |
| 2/3/5/6 | 3 | 0 | Arresti domiciliari | 3 mesi |
| 2/3/5/6 | 3 | 1 | Arresti domiciliari | 4 mesi |
| 2/3/5/6 | 3 | 2 | Carcere | 5 anni |
| 2/3/5/6 | 3 | 3 | Carcere | 6 anni |
| 2/3/5/6 | 3 | 4 | Carcere | 7 anni |
| 4/7 | 6 | 0 | Carcere | 6 anni |
| 4/7 | 6 | 1 | Carcere | 7 anni |
| 4/7 | 6 | 2 | Carcere | 8 anni |
| 4/7 | 6 | 3 | Carcere | 9 anni |
| 4/7 | 6 | 4 | Carcere | 10 anni |
| 8/9 | 5 | 0 | Carcere | 5 anni |
| 8/9 | 5 | 1 | Carcere | 6 anni |
| 8/9 | 5 | 2 | Carcere | 7 anni |
| 8/9 | 5 | 3 | Carcere | 8 anni |
| 8/9 | 5 | 4 | Carcere | 9 anni |

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1. **Implementazioni future**

Nelle prossime versioni della nostra applicazione, alcune features che potrebbero essere implementate sono:

1)Inserimento GUI;

2)Inserimento prove incastranti;

3)Inserimento riduzione pena;

4)Inserimento paese di appartenenza dell’imputato;

5)Inserimento paese di appartenenza del carcere a cui è assegnato un imputato;

6)Estensione delle tipologie dei reati e pene annesse.

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1. **Processo di sviluppo e organizzazione del lavoro**

Il progetto è stato sviluppato a partire dalla fine di Gennaio 2022 fino a circa metà Febbraio 2022, completamente in presenza.

Fortunatamente essendo coinquilini abbiamo potuto lavorare costantemente e contemporaneamente, senza dover ricorrere a piattaforme di comunicazione, potendo così avere un confronto immediato e anche una maggior efficienza nello sviluppo dell’applicazione.

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1. **Conclusioni**

Come anticipato, riteniamo che il nostro progetto sia stata una vera e propria sfida e, nonostante le varie difficoltà, riteniamo di essere riusciti a gestire al meglio le varie situazioni e a raggiungere gli obiettivi prefissati, traendo dunque il meglio da questa esperienza formativa.

Ringraziamo per l’attenzione.

Il gruppo, **VINMIC**

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